THE INDEPENDENT JOURNAL OF THE LARGE FORMAT MOTION PICTURE INDUSTRY

LF examiner®

Nov.-Dec. 2018
Vol. 21, No. 6

Upping Our Game: Improving the GS Theater Experience

by Gord Harris

Giant-screen theaters now face a disruptive transition from lamp-based projectors — both film and digital — to solid-state illumination with RGB laser systems that have the potential to improve image quality while substantially lowering operating costs. Multi-projector systems, coupled with new auto-calibration technology for warping and blending, can now far outperform single 4K-projector solutions.

The differences between GS theaters and multiplexes have been eroding as the latter have adopted larger screens, digital surround sound, stadium seating, and other elements that decades ago were unique to GS theaters.

The latest projection systems could enable GS theaters to create a more differentiated, immersive visual experience that would effectively compete with premium commercial theaters and 4K home theater systems.

This article is intended to help you understand the improvements in image quality that can move GS theaters firmly into the "aspirational future" section of the latest Digital Immersive Giant Screen Specifications (DIGSS 2.0) today, here and now. It will also outline some recent developments in High Frame Rate (HFR) and suggest a few other areas that might still be improved in the future.

Perhaps one of the most oft-noted advantages of GS theaters is their tremendous resolution and the amount of detail visible in wide shots. In the early days of **Imax Corporation**, its newly invented 15/70 film format provided at least nine times the resolution of the standard 4-perf, 35mm film prints then shown in commercial theaters. By making their screens about three times as high and wide as conventional theaters, GS theaters clearly differentiated themselves from most other cinemas.

But how is the situation different today? And what exactly do we mean by resolution? We will cover two major categories of image resolution in this article: spatial and temporal.

Spatial resolution

DIGSS 2.0 specifies addressable vertical and horizontal resolution, which until recently has been limited by the commercially available chipsets used in digital cinema projectors to 4,096(H) by 2,160(V) pixels, i.e., 4K resolution. But using the term "4K resolution" to define performance may be overly simplistic because it omits other factors that impact final system resolution and hence the perceived image quality for different viewers. For instance, lenses, compression, screen surface finish and perforations for sound affect perceived system resolution, as does seating position.

Standard 4K lacks what many GS enthusiasts consider a critical aspect: the tall screen height of the image. The 15/70 film frame has a tall aspect ratio of 1.43:1, and many believe this to be an essential differentiating factor for the GS experience. Although no digital projector chip set has been made with this ratio, IMAX laser projectors display a 1.43 image using anamorphic lenses, which will be discussed below. It is also possible to project the tall ratio with blended systems of multiple projectors

Not everyone in the GS industry agrees that maintaining the 1.43 ratio is important. They contend that using the same wide 1.9:1 aspect ratio as conventional cinema is "good enough." If all you want to do is show DCI-compliant Hollywood movies, perhaps it is.

However, even if one grants that standard 4K is good enough for flat screens, it does not cover dome theaters effectively because of their much greater vertical viewing angles. IMAX Dome theaters present images 180° horizontally and about 126° vertically for good look-up and look-down angles, and digital fulldome theaters project circular fisheye-type images onto a full hemisphere, 180° horizontally and vertically.

How much resolution is enough?

Ultimately, what really matters for high-resolution imagery is not simply the number of pixels on the projector but the angle that the image subtends at the eye of the viewer. Contrary to popular belief, 20/20 vision is not perfect eyesight, just average. Better visual acuity of 20/15 or even 20/13 is sometimes observed in young combat pilots and is often attainable with

*(see **IMPROVING** on page 6)*

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LF examiner
THE INDEPENDENT JOURNAL OF THE LARGE FORMAT MOTION PICTURE INDUSTRY

Founded 1997 as MaxImage!

Nov.-Dec. 2018
Vol. 21, No. 6

Editor/Publisher
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Associate Editor
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Circulation Manager
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Published 9 times a year by Cinergetics, LLC, and distributed by first class mail.
Printed in the USA.

ISSN 1532-5504

Subscriptions: US$397
Outside North America: US$447
All payments must be made in US funds.
Substantial discounts are available for multiple subscriptions to the same address.

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Will Laser Domes Change the Game for GS Filmmakers?

by Daniel Ferguson

Let's face it, for many filmmakers the dome has a maligned reputation. I've certainly grimaced at seeing images I know to be full of color, contrast, and sparkle projected on the warped, washed-out canvas of gloom. And yet...if shot, posted, and projected optimally, a dome experience can be more indelible and visceral than anything on the flat screen.

Every GS filmmaker who has attended one of **Paul Fraser**'s Giant Screen 101 presentations at a **Giant Screen Cinema Association** conference knows that filmmakers ignore the dome at their peril. Together these screens represent 40–45% of our total box office revenue, even though they make up less than a third of the market. And yet most of us don't see our films on a dome until they are finished. When it's too late. But thanks to **Evans & Sutherland**, **D3D Cinema**, and now **Imax Corporation**, we don't have to wait for the answer print to make changes.

Daniel Ferguson

In early November, I reached out to **Michelle Duncan** and her team at the **Tech Museum of Innovation** in San Jose, CA, to arrange a private screening of ***Superpower Dogs*** – both the GSCA demo (which we color timed for the flat screen) and a DCP of the complete film (non-timed).

As you have read in previous issues of *LF Examiner* (*see Summer 2018 and Sept-Oct 2018*), The Tech has just installed the first IMAX with Laser system for dome theaters. This enabled me to screen the film from existing DCPs. (I did not reach out to E&S or D3D to investigate the cost of applying a multi-projector stitch for their systems.)

The experience was revelatory. While I don't want to use this space to promote any particular hardware, I was honestly reacquainted with the dome experience. Vivid color saturation, crisp blacks, unbelievable steadiness and brightness. I did have some issues with the highlights and overall sharpness, but the screening showed us exactly where the problems were and allowed us to identify a strategy for improving the film, specifically for the dome.

The idea of tailoring your film to the dome is certainly not new. **Greg MacGillivray** and his team were among the earliest adopters of the strategy of shooting for the dome first, and it has served them extremely well. Their films routinely look fabulous on the dome for all the reasons we have come to grasp: 15/70 capture, printing from original negative, composing shots with the subjects in the lower third, favoring the widest lenses in the arsenal, heavy grad filters, forward-moving shots, high-contrast cobalt skies, etc. The MFF team has also routinely created complete rough cuts, which can be projected on a dome and subsequently improved.

According to **David Keighley**, Imax's chief quality officer, most early GS pioneers including **Graeme Ferguson** and **Toni Myers** had to wait to see a full answer print on the dome (once the negative was cut) before making timing changes for OMNIMAX. (An exception was 1982's ***Hail Columbia!***, which was assembled as a full-length 70mm work print for a screening at **Caesar's Palace** in Las Vegas.) One option in the pre-digital era was to drop the horizon by creating an "OMNI-shrink," a 10% optical reduction of the full size of some shots. They also routinely shrank and lowered titles for dome versions.

In the digital era, when the sensors of digital cameras offer a wider aspect ratio, the team at **SK Films** applied sky extensions on more than 20 shots for the dome version of ***Flight of the Butterflies***. Ever since, "dome-optimized version" has been a buzz-word at GSCA conferences.

Frankly, the main thing limiting how much "optimizing" we do is cost and lack of planning. When we shot ***Jerusalem***, we often found ourselves double shooting: we would shoot a wider 2D alternative of a particular 3D setup. Eight times out of ten we used the wider dome-friendly version of the shot in the final edit. But that meant either converting the shot to 3D at significant expense, or just offsetting it and giving up on a juicy stereo moment.

When I saw the E&S demo at the GSCA conference in Toronto in 2016 and the subsequent D3D demo at the 2017 conference in Chicago, I began to wonder if we might be on the cusp of a new approach. Would it be possible to create workflows for two wholly unique, parallel versions of the same

film, dome and flat? Each would be edited, timed, framed, and curated specifically for its screen shape. After all, we already do this on a smaller scale to create widescreen versions of our films.

With *Superpower Dogs*, I'm engaged in an experiment to see how possible and affordable this concept is. Following the screening in San Jose, here's a breakdown of our plan:

1. Re-edit the master version

The first thing I did was go back into the offline edit and adjust shots I knew would be problematic for both dome and flat. We got rid of a few fast-moving lateral shots, changed the duration of fades and transitions, and found replacement takes that would work for both formats.

2. Create a separate dome edit

Our strategy for keeping costs down was not to make any picture changes that would affect the final sound mix. This was fine, because most of the shots we changed were wide or extreme close-ups with no discernible hard sync points (**Tim Archer**, I owe you a drink if you find them). After the initial edit above, we ended up selecting only a handful of shots that will appear only in the dome version.

3. Sky-extensions

The next step was to select 20–25 shots for easy (cheap) sky extensions that could be done by using in-camera reframes or VFX. A few of these extensions appear in the 3D version, but most are only in the dome version, much like *Flight of the Butterflies*' approach.

4. Grad filters

A gradation filter darkens the top third of the image in a natural and gradual way so as to reduce dome cross-wash and direct attention to the lower third. I've often found them distracting when overdone on flat screens or 3D. In this case, we did wedge tests to determine the degree of grad to apply. For scenes in the snow (which are particularly unforgiving on the IMAX laser dome), with white skies, or shot at high noon, we applied a heavy or double grad. For blue skies, overhead forests, or "magic hour" (just before sunrise or just after sunset, when the sun is no longer visible, but its light is evenly diffused) we applied weaker, subtler grads.

5. Separate timing

This could get very expensive if we weren't careful, so we arranged for a cheaper "rehearsal" timing in a smaller Digital Intermediate room in Montreal. Our DP **Reed Smoot**, ASC, worked with local colorists to experiment before we set the master references for the post team at Imax Corporation. Once we set the master 3D timing, we experimented with a range of settings to adjust highlights, contrast, and saturation for the dome version.

All of this will be tested in the coming weeks when we go back to San Jose. The point is that we can now do some or all of this *before* picture lock, final timing, and filmout. Hopefully, the result will be a better version for both formats, but particularly for the dome. One thing I've already determined is that I will *never* picture-lock a film again without first seeing it on a dome.

My current estimate on the cost of all this? With travel, timing hours, labor, etc., I'm going to ballpark it at $20,000–$25,000. We'll see if it's worth it. The point is that better dome experiences are now with within our grasp and soon we won't have to spend half the movie pretending to tie our shoelaces!

Stay tuned for an update in a coming issue.

Photo by Michelle Thompson-Duncan.

The renovated booth at the Tech Museum in San Jose, CA. The boxes on tall stands are chillers for the lasers.

Daniel Ferguson is director and writer of **Superpower Dogs**, *a giant-screen film from* ***Cosmic Picture*** *now in production for release in March 2019. His previous credits include* **Jerusalem** *(2013) and* **Journey to Mecca**. *He can be reached at daniel@cosmicpicture.com.*

Cincinnati installing IMAX laser

In mid-November, Ohio's **Cincinnati Museum Center** reopened to the public after a $224 million renovation that lasted more than two years. The project affected nearly every aspect of the immense 85-year-old Art Deco train station-turned-museum, driven primarily by the need to repair water damage that had accumulated over the decades. According to a press release, "exterior masonry, windows, rooftops, even the fountain and plaza were repaired, replaced, and waterproofed. Historic spaces and artwork critical to the building's historic fabric were also restored."

The Museum Center's Robert D. Lindner Family OMNIMAX Theater was not ready with the rest of the facility, but reopens in late December with a new IMAX dome laser projection system that replaces the 15/70 film projector installed in 1990. It is the second installation of the 4K single-projector system **Imax Corporation** first rolled out at **The Tech Museum of Innovation** in San Jose, CA, in November (*see "A Tale of Two Domes," Sept.-Oct. 2018*).

Cincinnati's renovated theater is also getting Imax's new six-channel sound system for domes, a new **Spitz** Nanoseam skin for the 72-foot (22-meter) dome, new carpeting and lighting, and a new theater automation system. New wider seats will lower the seat count from 254 to 227, although four seats could be restored if proposed regulations regarding laser illuminated projectors are adopted. The price tag for the theater renovations was $3 million, donated by the **Bank of America**.

The renovated rotunda of the Cincinnati Museum Center.

Dave Duszynski is president of **Mercury Museum Services**, a wholly-owned subsidiary of the museum center. He tells *LF Examiner* that the theater will reopen on Dec. 21 with **SK Films'** ***Volcanoes: The Fires of Creation***, for which he was an executive producer. "*Volcanoes* is not only a great film for the dome and for showing off what the theater is best at — taking you to amazing places that you can't get to on your own or wouldn't want to — the film is also supported by the **Giant Dome Theater Consortium** of which we are a part." It will be the only film on the schedule when the theater reopens.

Cincinnati's dome getting its new Nanoseam skin.

The Cincinnati theater was the site of **Imax Corporation**'s private demonstration of its new laser dome system last May (*see Summer 2018*). That prototype projector was removed shortly after the demo; the unit being installed permanently this month is a production model.

La Géode closed for renovation

La Géode, the 33-year-old IMAX Dome theater in Paris, closed on Nov. 30 for renovations that are expected to be completed in 2020. The distinctive silvery sphere is adjacent to the **Cité des Sciences et de l'Industry**, which has contracted with **Les Cinémas Pathé Gaumont**, a major European theater chain, to manage the theater. No announcement has been made about what projection system the theater will have when it reopens, or how it will be programmed.

Since 1985 the 85-foot (26-meter) dome has been operated by a government-owned corporation or SEM (*société d'économie mixte,* literally, "mixed economy company") that has programmed and operated the 400-seat theater and the other spaces in the spherical building. As we reported previously (*see Biz, Feb-Mar 2017),* in January 2017 the Cité issued a call for a new operator that would provide "innovative projects" for the theater, citing the problem of competition from the "proliferation of screens and formats...and high-tech home and mobile viewing devices."

Cincinnati Museum Scenter

The Cité des Sciences et de l'Industrie and La Géode in Paris.

SimEx/Iwerks teams with MFF

SimEx/Iwerks Entertainment and **MacGillivray Freeman Films** are partnering to create three new flying films for the Vertical 4D Experience, a new theater attraction that simulates flying. MFF is producing ***Flying Across America*** for release in spring 2019, followed by ***Flying Around the World*** in the summer, and ***Flying Wild*** in the fall. The titles, all under ten minutes long, will contain a mix of new material and previously captured footage.

The new Vertical 4D Experience suspends between 20 and 100 riders in motion seats within a giant curved screen with digital projection; 3D and laser projection are optional. Four-D effects include wind, scent, vibrations, and special lighting.

In addition to the MFF titles, SimEx/Iwerks offers experiences based on Hollywood films such as *The Martian, Man of Steel, San Andreas, Ice Age*, and the computer game *Angry Birds*.

Dreamworld adds flying ride

Dreamworld, a theme park near Brisbane, on the east coast of Australia, has installed a 60-seat iRide Flying Theater on the site of its former IMAX theater. Supplied by Taiwan-based **Brogent Technologies**, the attraction will be the first flying ride in the southern hemisphere when it opens in late December. The AUD$15 million (USD$11 million) attraction suspends riders in a vertical dome on which POV flying footage is digitally projected, accompanied by effects such as wind, mist, and scents.

The iRide system is part of a major overhaul of the park that is intended to boost the park's sagging attendance in the aftermath of an October 2016 water ride accident that killed four people.

Australia's largest theme park, Dreamworld opened in December 1981 with one of the first 25 IMAX theaters in the world, and the first in the southern hemisphere. The 315-seat auditorium featured a 40x69-foot (12x21-meter) screen, and its 15/70 projector operated until January 2011, when it was replaced by an NEC 2K digital projector.

Dreamworld is the second former IMAX venue to be converted to a flying ride. In 2013 the former IMAX 3D theater at Canada Place in Vancouver, BC, was turned into **FlyOver Canada** (*see Summer 2013*).

Comeaux made head of Exploreum

The **Gulf Coast Exploreum Science Center** in Mobile, AL, has appointed **Don Comeaux** as its new executive director. Comeaux has been with the center since 2011, starting as education program specialist, and rising to assistant director, a position he held for four years. He has been acting executive director since the previous incumbent, **Jan McKay** resigned in May.

Don Comeaux

Before entering the museum world, Comeaux was a high school and middle school science teacher in Louisiana. He holds B.S. in biology from Nicholls State University in Thibodaux, LA.

The Exploreum features a 177-seat IMAX Dome theater under a 59-foot (20-meter) dome. The theater opened in October 1998 and still uses its IMAX 15/70 film projector.

Santavuori is consulting

Kai Santavuori, formerly with **Heureka**, the Finnish science center, tells *LFX* that he has launched a consultancy for museums, science centers, cinemas, and planetariums. His current clients include **Kakslauttanen Arctic Resort** in northern Finland, which will feature Scandinavia's largest fulldome theater when it opens at the end of 2019; a company planning a leisure complex in Moscow that will include a planetarium/fulldome theater, an IMAX theater, and ten smaller cinemas; and a science center and fulldome in Asia.

Kai Santavuori

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Gord Harris

*(from **IMPROVING** on page 1)*

glasses or contact lenses.

Resolution does not have one standard definition, but in optics it started as a measure of how easily two closely spaced points, such as stars, can be discerned. Typically people with average 20/20 visual acuity can resolve stars about 1 arc minute apart (1 arc min = one sixtieth of a degree). Those with lesser vision might only see a single blob of light instead of two.

GS theaters were originally designed so that a viewer in the center seat would see roughly 90° from the left to the right side of the screen — what is called the horizontal field of view (HFOV). (*See figure on this page.*) Since there are 60 arc minutes per degree, that central viewer sees about 60 x 90 = 5,400 arc minutes from side to side, all in one glance. Since average 20/20 visual acuity is limited to about one arc minute, this implies that if we had 5,400 pixels across the screen, we would just barely be able to pick out alternating black and white pixels from the center seat. Of course, if you sit closer to the screen you'll need more pixels, and as we will see, in domes you need even more. The best film stocks capture up to 100 line pairs per mm, for almost 10K capture on 15/70 film.

Clearly then, 4K digital projection using only one projector does not really match the full resolution of 15/70 film, but it is better in most other respects and far more economical. The GS industry has therefore accepted 4K as "good enough" for flat-screen digital projection, as described in the DIGSS 2.0 spec.

However, if you sit in a dome with 180° HFOV you need about double that 5.4K resolution if you want eye-limited acuity. So-called 8K dome systems with multiple projectors (some of which only project 6.5K different pixels along the horizontal axis) look much sharper than single 4K projectors with fisheye lenses. (*See figure opposite.*) This is why we really should not use the same resolution in domes as on flat screens, with their much narrower fields of view. The DIGSS 2.0 spec's stated minimum of 4,096 horizontal pixels is too low to look good in domes.

Stretching a single projector's worth of pixels on a dome has the result of very large pixels, so that even the best seats will see distractingly large pixels that become far worse as you sit towards the sides. [*Editor's note: This has been confirmed by people who have seen the recently announced IMAX laser dome projection system, which uses one 4K projector. See* LF Examiner*, Summer 2018.*]

Today, many standard movie theaters use 4K projectors on much smaller screens and many people already have 4K TV in their homes. GS domes and flat-screen theaters need to create an incredible experience that will get people out of their homes to see something far better than multiplexes and home theaters offer.

Christie has developed a better dome solution for some customers of **D3D Cinema**. The system uses three blended 4K projectors in portrait mode (i.e., turned on their sides) and provides about 5.7K horizontal resolution and 4K vertically for a full 1.43 aspect ratio. Christie has tested a similar three-projector system on a flat giant screen, nearly achieving eye-limited resolution like the 15/70 film of old with the full 1.43 aspect ratio.

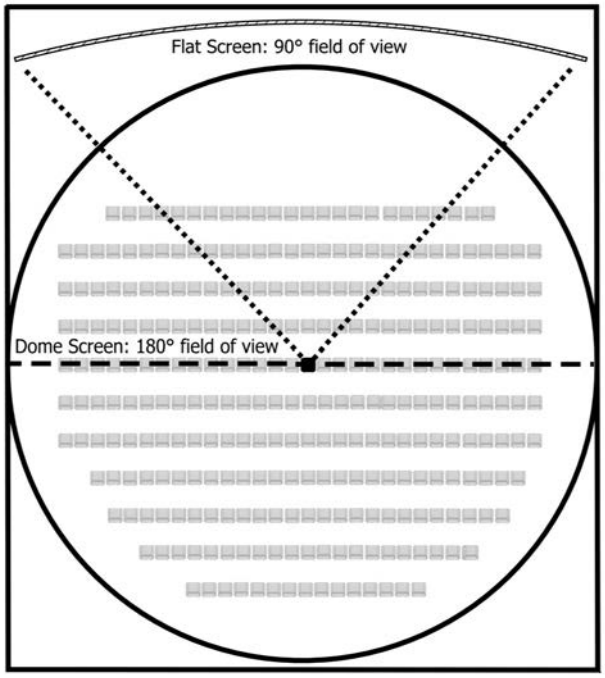
The 1x3 image contains 22 megapixels, compared to only 8.8 megapixels for a single 4K projector. On a dome or flat screen, it is clearly sharper than standard 4K with only 2,160 vertical pixels.

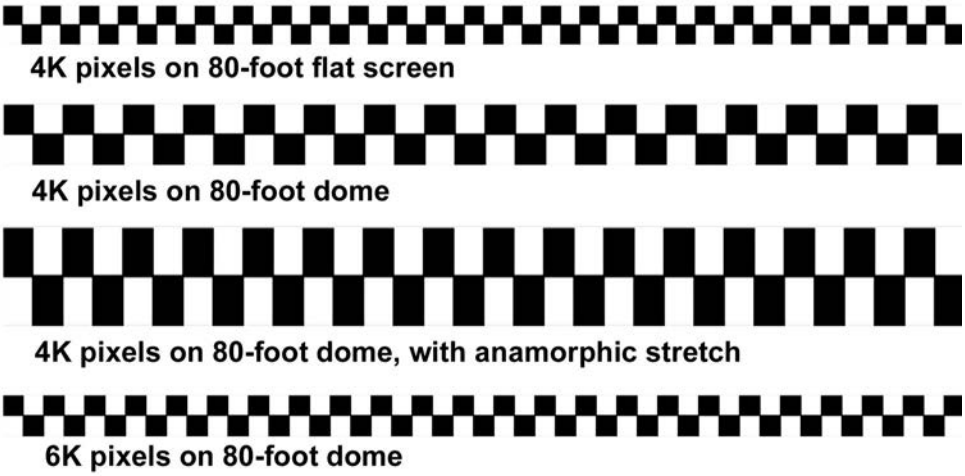
Companies like **Evans & Sutherland** have systems that use five to ten projectors to cover a fulldome screen, providing resolution even higher than a 1x3 system, up to true 8K.

Anamorphic projection

In the real world our visual acuity is about the same no matter which way we tilt our heads. In other words, we have equally sharp vision for vertical and horizontal lines, or lines at any angle for that matter. Therefore, if you want to reproduce what we see naturally, it is better to use square pixels than rectangular pixels.

IMAX laser systems have anamorphic lenses that stretch the image vertically in projection to fill 1.43-ratio flat screens and domes. (The films are given a corresponding "squeeze" in mastering so that the projected image does not appear distorted.) When you do this with projectors




4K pixels on 80-foot flat screen
4K pixels on 80-foot dome
4K pixels on 80-foot dome, with anamorphic stretch
6K pixels on 80-foot dome

with square pixels, the pixels are elongated, not square on the screen; the resolution is lower in the direction of the stretch. Systems that use standard non-anamorphic lenses and square pixels provide superior resolution to those using anamorphic lenses.

Also, if the multiple projectors in a blended system use standard lenses, each lens contributes a higher resolution, lower heat load, better depth of field, and higher image quality overall than any single fisheye lens can produce in a dome. This effect was very noticeable in the ten-projector 8K dome demo Evans & Sutherland presented (using Christie projectors and lenses) at the **Ontario Science Centre** in Toronto for the **Giant Screen Cinema Association**'s fall 2016 conference. In the demo the 8K digital system performed very favorably in comparison to 15/70mm film through a fisheye lens in side-by-side A/B tests. (*See LFX, Oct.-Nov. 2016.*)

Frame rate/temporal resolution

So far we have focused mainly on static images. But what happens when the images move? Moving details are another whole kettle of fish, and this is where many problems occur with GS film's rate of 24 frames per second. We may have incredible static spatial resolution when the images on are relatively still, but fine details can go to mush very quickly if they move. And it is those fine details in the beauty shots that make GS movies spectacular. We therefore differentiate the effective visual resolution of moving images with the terms "temporal resolution" or "dynamic resolution" which is affected first and foremost by frame rate.

Temporal resolution affects a number of perceptual factors, including an effect we call "strobing," which is a jerky, stuttery artifact that occurs when the camera pans too fast or flies over a landscape too quickly. Strobing has always been one of the biggest limitations of GS films, and experienced filmmakers go to great lengths to minimize it when shooting at 24 fps. You can notice it particularly in the periphery of flying shots with bright images like white waves on dark water, or other high-contrast subjects, diverging out to the edge of the screen or dome. In aerials like this, often only the only sharp objects you can see are in the center of frame towards which you are flying; the rest strobe badly.

Temporal resolution with motion affects another factor: the apparent sharpness of moving subjects. We commonly refer to this as "smearing" or "motion blur" — the softening of edges. Almost all fulldome shows use 60 fps to keep things sharp; preventing stars from smearing into lines, for instance. (*See graph on page 8.*)

Even on flat screens 60 fps can maintain 2K resolution with motion as fast as 3 degrees per second. Clearly 120 fps is the sharpest of them all, as Christie, **Doug Trumbull**, **Pierre Routhier**, and I have demonstrated at several GSCA conferences. In a demonstration and survey held at the GSCA Filmmakers' Symposium in Los Angeles, spring 2016, 120 fps received the highest audience ratings.

A perceptual study by Dr. Laurie Wilcox at **York University**, Toronto, Ontario, also found a clear preference for higher frame rates, regardless of content, with the greatest benefit of 60 fps or higher being in action shots with very rapid motion. These findings are consistent with simulation and gaming, which almost always run at 60 fps or higher. For simulation clients like FlightSafety International, Christie has upgraded many flight simulators to 120 fps to achieve even better dynamic resolution.

Simulators and 3D HFR, as shown by Showscan pioneer Doug Trumbull with his Magi process, can benefit from 60 fps per eye interleaved displays for a net perceptual effect close to 120 fps in 3D. But few people have yet witnessed such systems and they seem limited to special venues for the time being. [*Editor's note: Trumbull has said that he is planning to produce a feature film in his HFR format in the next year or two.*]

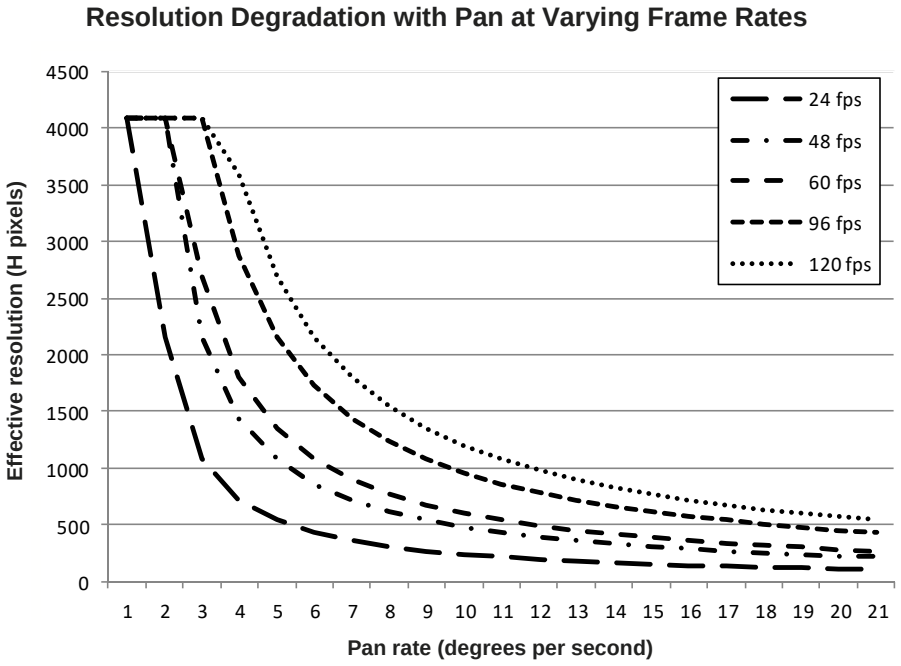
The latest Christie 4K RGB laser projector family is capable of full 4K resolution at frame rates from 24 to 120 fps. For some specialized applications, the projectors can even run from 240 to 480 fps at 2K resolution. This is where a very fast pixel clock is essential. The ChristieTru-Life electronics platform has a pixel clock that can spit out 1.2 billion pixels per second with standard warp and blending, enabling multiple-projector displays.

HFR at 240 fps is an order of magnitude better than 24 fps in most image quality respects, but the economics of dealing with that much data in the production and post-production process will make it impractical for the GS world for quite some time.

Even moving to 120 fps would have obvious economic implications for shooting, processing, and projecting. There aren't many camera systems that can shoot HFR, HDR, and high spatial resolution all at the same time, and the post-production community is generally not geared up for a five-fold increase in data storage and processing. Furthermore, filmmakers like having slow-motion capability, especially for GS wildlife filming, which would not be feasible if everything were already being shot at 120 fps.

Data wranglers already have challenges

*(see **IMPROVING** on page 8)*



*(from **IMPROVING** on page 7)*

with 4K file sizes at 60 fps. Projection servers must currently be run in parallel to project high-resolution 120 fps at 4K. Feeding two 4K feeds at 60 fps with even/odd frames is common today and is the backbone of what is needed for 4K 120fps. But overall many feel that 60 fps economics as used in fulldomes, games and simulators is a "good enough" improvement from 24 fps, and has already been proven to work.

DIGSS 2.0 suggests 60 fps or higher as the new standard frame rate for GS theaters, which seems like a sensible compromise between 24 and 120 fps.

For purely fictional works of imagination, such as dramatic feature films, 24 fps seems to work well enough, perhaps because our brains fill in the details. We put up with the strobing, flicker, and motion blur as part of that conditioned dreamy "film look."

But for GS documentaries hoping to transport people with that "you-are-there" feeling of reality, there are many benefits to considering HFR projection at 60 fps or higher. Unfortunately there are also many obstacles. Producers will have to collect 2.5 times more data when shooting (not a trivial change), and distributors will have to determine which theaters can project 60 fps, and which cannot. (For instance, IMAX laser systems are not capable of projecting 60 fps.) Variable frame rate — i.e., shooting and displaying some scenes in HFR, and others at 24 fps when HFR is not needed — would require fewer resources. But it is not yet clear how the logistics of variable frame rate in capture, post, and distribution would work. Versioning is enough of a problem already, so a decrease in standardization on frame rate might fragment the GS industry further.

For these and other reasons, no GS productions have yet been shot and mastered at 60 fps.

(*For more articles by Gord Harris on HFR, see* LF Examiner: *"Servers for GS Cinema," Oct.-Nov. 2016; "The Case for HFR in Giant Screen Theaters," Sept. 2016; and "HFR Demo Survey Results," Summer 2016.*)

Contrast and dynamic range

Image contrast is what gives images "snap" and "clarity." (*See figure opposite.*) Generally you can count on filmmakers to produce pictures with good contrast, but how theaters present those images depends on their projectors and lenses, as well as other factors.

Image contrast is the ratio of on-screen luminance between the whitest white and the darkest black, measured in foot-Lamberts (fL). One fL is about the luminance of a twilight sky and is also the minimum level for human color vision. If the white area measures 100 fL and the black area measures 0.1 fL we would say the contrast ratio is 100/0.1, or 1,000:1.

A common way to measure contrast is to display a checkerboard with black and white squares. This is called "intra-frame contrast ratio" in standards parlance because it is on screen all at one time, within one frame, not one-at-a-time sequentially. Sequential contrast is found by measuring a full white frame and a full black frame separately. Also known as "interframe contrast ratio," sequential contrast ratios are typically very high: many thousands to one, on standard projectors.

Both high sequential and intra-frame contrast are important. For good-looking images you need a minimum of 150:1 intra-frame contrast ratio, per DIGSS 2.0 guidelines. This is in a giant flat-screen theater with all the normal exit signs and stair lights, which degrade the blacks on-screen somewhat. Obviously, the darker your theater, the better.

The minimum DIGSS 2.0 standard for sequential-image contrast ratio is 1,500:1 but you should really aspire to 4,000:1 or higher if you really want to match the best that film used to produce with high-quality prints in a fully darkened theater.

Some of the newest Christie HDR projectors can actually project images with a 1,000,000:1 contrast ratio, which is six orders of magnitude. Not quite as high as the real world billion-to-one range that human eyes are capable of perceiving, but much, much better than other projectors.

Understanding HDR

The latest family of RGB laser-illuminated projectors from Christie includes high-end High Dynamic Range (HDR) units using multiple digital micro-mirror device modulators from **Texas Instruments**. When projecting images like a night sky starfield the effect is spectacular: the most beautiful dark sky you have ever seen, with dazzlingly brilliant pinpoint stars. These new projectors out-perform the contrast ratio of any film-based projector ever made. The blacks are perfectly black, so black that you cannot see the

edge of the frame or any blend zones on multi-projector domes.

High contrast is particularly important in domes. One of the biggest factors limiting contrast in domes is cross reflection of light from other portions of the screen. For example, full white light from a bright object like the sun, moon, or space shuttle will bounce across the dome to brighten any dark areas of the picture. So the blacks become gray, reducing contrast. Not only direct light, but diffuse light scattering from the screen goes off in many directions and degrades dark areas anywhere. The lighter the dome screen paint (the higher the reflectivity) the more reflections you will get.

In the early days of GS domes, customers did not understand this effect very well and thought that whiter domes would be brighter and better. Flat paints with reflectivity of 90% or more were sometimes used, resulting in system contrast ratios as low as 2:1 or 3:1!

We now know that the solution for improving system contrast is lower-reflectivity paints. For example, if reflectivity is only 30% instead of 90%, then 70% of the incident light is absorbed, not reflected. This means the white portions of the image will be dimmer but the cross-reflected light will attenuate very rapidly after a few bounces. As a result, dark areas remain much darker, because there is less bounce light, and contrast is improved. Our eyes can and do easily adapt to different brightness levels, but they cannot adapt to or correct missing contrast.

HDR in domes

What about HDR in domes: why bother with projectors with million-to-one sequential contrast? Well, the answer is that their images will look much better than regular projectors because filmmakers are usually wise enough not to fill half the dome with white objects. **Eastman Kodak** has determined that the reflectance of the average outdoor scene is about 18%. In an extreme case, like white stars in a black sky, where maybe only 1% of the screen is full white and the rest dark, system contrast can approach that of flat screens, since there is so small a white area cross-reflecting to degrade the black area. In fact, Christie has measured more than 20,000:1 local contrast on flat screens with small white squares in the corners and black in the center, even with light scattering from the lens and some light reflected back from the room. A fully darkened planetarium with an HDR RGB laser system can now rival the darkest skies on the planet for contrast.

Contrast ratios degrade exponentially with increasing ambient light, so it is also critically important to reduce ambient light sources in theaters and domes to the minimum required by safety regulations. If an 8,000:1 contrast projector displays a 20 fL white DIGSS-spec image, your goal should be to get the black level on screen down to 0.0025 fL (20/8,000) to see the full benefits of the system. Modern HDR lens designs are also critical for achieving good contrast.

Summary

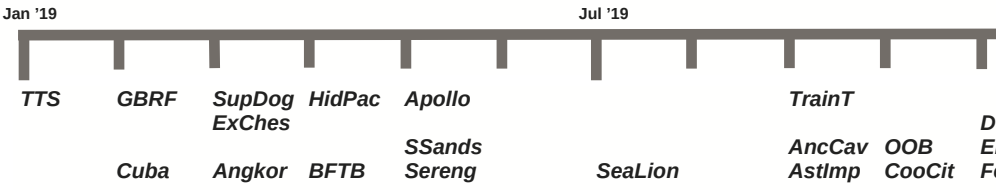
We have seen in this article how the immersive "you-are-there" feeling can be achieved in a giant-screen theater by closely matching human perceptual needs as experienced in the real world. Sufficient brightness, vivid colors, realistic smooth motion, high resolution, and high dynamic range can all be provided with well-designed RGB laser illuminated projection systems. Tradeoffs must of course be made between screen size, electrical power, and expense, as we strive for higher and higher performance.

But recent developments in RGB laser capabilities, auto-calibration systems, and optical design have significantly changed the GS game by improving aspects of image quality while greatly simplifying alignment and maintenance, and lowering costs. Very high resolutions that match or exceed 15/70 film are now possible with auto-blending, multi-projector RGB laser systems that project seamless uniform images on flat or dome screens, achieving most of the "aspirational" specifications of DIGSS 2.0.

Gord Harris is a retired amateur scientist who founded the IMAX camera department and spent 23 years doing research with Imax Corporation in various roles, followed by freelance R&D consulting, then 14 years at Christie, where he was known as "Dr. Dome" in Research and Innovation. Some of his inventions include the Solido 3D camera and the 1x3 portrait dome projection system.

Christie commissioned and compensated the author of this article and submitted it to LF Examiner*, which edited it to meet its editorial standards and requirements for publication. No consideration was offered or accepted by either party.*

Low contrast (left) versus high contrast.



* New listing.
All films are 3D unless noted; underlined titles are 2D.
Updated information is printed in bold.
Unless noted, all films run about 40 minutes.

Touch the Stars
Afterglow Studios; distributor: BIG & Digital; director, producer: Luke Ployhar; script: Scott Pearson. ***Release: January 2019.***

Great Bear Rainforest *(wt)*
Spirit Bear Entertainment; distributor: MacGillivray Freeman Films; directors, producers, DPs, script: Ian McAllister, Jeff Turner; score: Hans Zimmer; executive producers: Byron Horner, Kyle Washington. ***Narrator: Ryan Reynolds.*** *Release: Feb. 15, 2019.*
– Principal photography is complete. Post production has begun.

Cuba
Golden Gate 3D; distributor: Giant Screen Films; director: Peter H. Chang; producers: Peter H. Chang, Violet Angell, Robert Mooring; DPs: Peter H. Chang, Christopher Doyle HKSC, Peter Zuccarini; script: Mose Richards, Robert Mooring; executive producers: Neil Nightingale, Mike Day, Jonathan Rowe, Kelyn Brannon. Cast: Patricia Torres, Eusebio Leal, Daria Siciliano, Fernando Bretos. Release: early 2019.
– Film will be converted to 3D.
– Educator's guide, marketing materials, and social media assets are being produced.

Superpower Dogs *(wt)*
Cosmic Picture; distributor: Imax Corporation, Cosmic Picture; director: Daniel Ferguson; producers: Taran Davies, George Duffield, Dominic Cunningham-Reid, Daniel Ferguson; DP: Reed Smoot; script: Daniel Ferguson; score: Michael Cusson. Release: March 9, 2019.
– Picture is locked. Music, color timing, sound design and visual effects work under way.

Expedition Chesapeake
Whitaker Center Productions, Via Studios Global; distributor: Cosmic Picture; director: Greg Matosky; producers: Tom Curra, Greg Matosky; DP: James Neihouse. Cast: Jeff Corwin. 2D. Release: March 20, 2019.
– Principal photography is complete.
– Post production is under way.

Hidden Pacific
Giant Screen Films, Tandem Stills + Motion; distributor: Giant Screen Films, D3D Cinema; director, producer: Ian Shive. Release: April 22, 2019.
– Post production, narration, and editing are under way.

Angkor: The Lost Empire of Cambodia
Wild Pacific Media; distributor: K2 Communications; director, writer: John Weiley; producers: Murray Pope, Dave Gross. Release: Spring 2019.

Apollo 11: First Steps *(wt)*
Statement Pictures, CNN Films; distributor: MacGillivray Freeman Films. 2D. Release: May 17, 2019.
– **Post production is under way.**

Back From the Brink
Sean Casey Productions; distributor: Cosmic Picture; director, DP: Sean Casey; producers: Jen Casey, Sean Casey; script: Mose Richards. Release: Spring 2019.

Secrets of the Sands
Atlantic Productions; distributor: Serengeti Entertainment. Release: Spring 2019.

Secrets of the Serengeti
Digital Crossing Productions; distributor: SK Films; director, DP: Michael Dalton-Smith; producers: Michael Dalton-Smith, Jonathan Barker; script: Michael Dalton-Smith, Wendy MacKeigan; executive producer: Jonathan Barker. Release: Spring 2019.

Sea Lion: Life by a Whisker
Definition Films; distributor: tba. Release: Summer 2019.

Train Time *(wt)*
Stephen Low Company; distributor: Stephen Low Company; director, script: Stephen Low; producers: Pietro Serapiglia, Stephen Low; executive producer: Paul Globus. 2D. Release: September 2019.
– In 2018 have filmed railroad network operations center in Fort Worth, TX, a wide range of yard operations, and helicopter aerials of train action across a range of states, including spectacular live steam locomotive footage and freight trains in Illinois, Missouri, Oregon, and Washington.

Ancient Caves *(wt)*
Oceanic Research Group; distributor: MacGillivray Freeman Film Distribution; director, DP: Jonathan Bird; producers: Jonathan Bird, Art Cohen; script: Jonathan Bird, Art Cohen; score: Bruce Zimmerman; executive producer: Shaun MacGillivray. Cast: Dr. Gina Moseley, Dr. Larry Edwards, Brian Kakuk, Todd Kelly, Dr. Keith Tinker. All digital formats. 2D. Release: Fall 2019.
– September: Dry caves in France.
– November: Submerged Mayan remains in Mexico.
– **Principal photography is complete. Post-production has begun.**

Asteroid Impact
Imax Corporation; distributor: Imax Corporation. Release: Fall 2019.

Out of Bounds *(wt) **
Follow two snowboarders along their journey as they ride the heavily glaciated Chugach Mountains of Alaska for the first time.
Wild Pacific Media; distributor: K2 Communications; director: Caspar Mazzotti; producers: Nick Robinson, Dave Gross; script: Nick Robinson. Cast: Torah Bright. Release: Fall 2019.
– November: Filmed landscapes, wildlife, snowboarding, and climbing in Antarctica.

Cool Cities
Wild Pacific Media; distributor: K2 Communications. Release: Late 2019.

The Dolphin Ambassador *(wt)*
Milbrand Cinema; distributor: MacGillivray Freeman Films; director, producer, DP: Lance Milbrand; editor: Dave Choice; score: Icarus Music. Cast: Kathleen Dudzinski, Eldon Bolton. Release: 2019.

Elephant
Wild Expectations, Ltd.; distributor: tba. Release: 2019.

Feathered Dinosaurs *(wt)*
Saint Thomas Productions; distributor: nWave Pictures. Narrator: James Faulkner. Release: 2019.

Secrets of the Universe
Stephen Low Company; distributor: K2 Communications; director: Stephen Low; producer: Pietro Serapiglia; executive producers: Bob Kresser, Mark Kresser. Narrator: Simon Helberg. Release: 2019.
– **November: Filming Large Hadron Collider and scientists at CERN and Geneva.**

Wingsuit Flyers
Grand Schema; distributor: K2 Communications; director: Christopher J. Scott; producers: John Molli, Christopher J. Scott, Aschi Michel, Tom Fore; DP: Robert Hollingworth; script: Christopher J. Scott; executive producers: Rob Sharps, Doug Greenstein, W. Kyle Gore, Daniel Verbic, Tom McCollum. Release: 2019.

Snow
St. Thomas Productions, nWave Studios; distributor: nWave Pictures; directors: Cyril Barbançon, Jacqueline Farmer; producer: Jacqueline Farmer; DPs: Cyril Barbançon, Jacqueline Farmer; script: Philippe Chappuis; score: Franck Marchal; executive producer: Eric Dillens: Release: Spring 2020.
– Have scouted locations in Belarus, France, USA, and Iceland. Shooting will resume in the next few months.

Einstein's Incredible Universe *(wt)*
Cosmic Picture; distributor: tba; director: Daniel Ferguson; producers: Taran Davies, George Duffield, Daniel Ferguson; script: Daniel Ferguson, Mose Richards; DP: Reed Smoot. Release: fall 2020.

Wild Wonders of China
Transcendent Media, Blue Sky Aerial & Specialist Filming; distributor: tba; director: tba; producers: Peta Milan, Staffan Widstrand, Vicky Degerfeldt; DP: Peter Degerfeldt. Release: fall 2020.
– November: Filming wild snow leopards in 8K.

Colours of China
Making Movies/ China Intercontinental Communication Company/Gebrueder-beetz Filmproduktion; distributor: tba; executive producer: James Heyward. Release: 2020.
– In production throughout China since January, final shoot scheduled for March 2019.
– November: Shooting the Peking Opera, and in Jingdezhen, porcelain capital of China.
– Will be released as 90-minute theatrical documentary and 40-minute GS version.

Dinosaurs of Antarctica
Giant Screen Films; distributor: Giant Screen Films; director: David Clark; producers: Don Kempf, Deborah Raksany, Andy Wood; DP: Reed Smoot; script: Deborah Raksany, Andy Wood Release: 2020.
– November: Filming in Illinois.
– January: Filming dinosaur backplates in New Zealand.
– February: CGI compositing begins.

Ireland
MacGillivray Freeman Films; distributor: MacGillivray Freeman Films. Release: 2020.
– **Principal photography is complete. Post-production has begun.**

Leonardo da Vinci: The Last Interview *(wt)*
Camera Lucida Productions; distributor: MacGillivray Freeman Films; director: Francois Bertrand; DP: Vincent Mattias; script: Serge Bramly, Francois Bertrand. Executive producer: Francois Bertrand. ***Release: 2020.***

MFF's New Adventure Film
MacGillivray Freeman Films; distributor: MacGillivray Freeman Films. Release: 2020.
– September, October: 6-week shoot in more than 35 locations in 14 states, including Crater Lake, Oregon Coast, Columbia Gorge, Mesa Verde, Canyon de Chelly, Niagara Falls.
– **Principal photography is complete. Post-production has begun.**

DMR FILMS:

Title	*Dist*	*Release*
Glass	*WDPD*	*1/18/19*
Alita: Battle Angel	*FOX*	*2/14/19*
How to Train Your Dragon: The Hidden World	*UP*	*3/1/19*
Captain Marvel	*WDPD*	*3/8/19*
Dumbo	*WDPD*	*3/29/19*
Shazam!	*WB*	*4/5/19*
Hellboy	*LG*	*4/12/19*
Avengers: Endgame	*WDPD*	*4/26/19*
Aladdin	*WDPD*	*05/24/19*
Godzilla: King of Monsters	*WB*	*5/31/19*
Dark Phoenix	*FOX*	*6/7/19*
Toy Story 4	*WDPD*	*6/21/19*
Spider-Man: Far From Home	*SONY*	*7/5/19*
The Lion King	*WDPD*	*7/19/19*
The New Mutants	*FOX*	*8/2/19*
Artemis Fowl	*WDPD*	*8/9/19*
IT: Chapter 2	*TBD*	*9/6/19*
Frozen 2	*WDPD*	*11/22/19*
Star Wars: Episode IX	*WDPD*	*12/20/19*

MacGillivray Freeman Films

Director Ian McAllister filming a rare spirit bear in British Columbia, Canada, for Great Bear Rainforest, *from MacGillivray Freeman Films.*

Bookings: Nov.-Dec. 2018 by Film

637 bookings of 101 films in 166 theaters

These listings to not include Hollywood films shown in multiplex IMAX theaters. Those films are listed when they are shown in non-multiplex theaters, and conversely, non-Hollywood giant-screen films showing on multiplex IMAX screens are also listed.

Listings shown in **bold face** below are new or updated listings. The rest are unchanged from the previous month's issue.

The data on the following pages are ***not*** warranted to be comprehensive or accurate in every detail, despite our best efforts to make them so. They have been compiled from theater surveys, distributors, the Web, and other sources.

We will make every effort to improve the thoroughness, and accuracy of these data. If your theater or film is not shown here, please get in touch with us to update our listings.

Where a date is not shown, it means that no date was provided by the source or, in the case of a closing date, that no date has been set, or that the run is indefinite.

The key to film abbreviations is on page 17.

Film	Theater	Open	Close
ACGOTS	Corpus Christi Lex	6/17/16	
	Dayton	6/17/16	12/31/18
	Hampton VASC	11/10/17	11/9/18
	Hutchinson	5/29/17	11/30/18
	Pensacola NAM	5/26/17	6/30/19
	San Diego MV AMC	11/10/17	11/9/18
	Toronto OP	6/1/18	6/1/19
	Washington NASM	5/26/17	5/25/19
AfricAdv	Katowice CC		9/30/19
	Krakow CC		9/30/19
	Lodz CC		9/30/19
	Poznan CC		9/30/19
	Warsaw CC		9/30/19
	Wroclaw CC		9/30/19
AirRacer	Hutchinson	1/19/18	1/31/19
Alaska	Shijiazhuang HST	1/1/17	1/1/19
AmazAdve	Austin TSHM	9/1/18	8/15/19
	Beijing 3D CSTM	2/6/18	2/15/19
	Charlotte DP	5/1/17	6/30/19
	Chicago MSI	5/26/17	6/30/19
	Cleveland	1/9/18	6/30/19
	Columbus COSI	1/10/18	6/30/19
	Daqing STM	2/16/18	2/15/19
	Dearborn THF	3/2/18	2/28/19
	Edmonton TWS	1/19/18	6/30/19
	Erie	**6/30/18**	**6/30/19**
	Gatineau	**12/16/17**	**3/2/19**
	Guayaquil	4/16/18	2/28/19
	Hampton VASC	3/31/18	3/30/19
	Houston MNS	**4/21/17**	**12/31/19**
	Indianapolis Imx	9/8/17	6/7/19
	Kagoshima	10/10/18	12/31/18
	Kuwait SCK	**6/14/18**	**12/31/19**
	Melbourne MV	9/15/17	9/13/19
	Mexico City Pap	11/17/17	11/16/18
	Orlando SC	2/24/18	2/23/19
	Peoria RM	6/20/18	1/19/19
	Phoenix ASC	8/16/18	2/15/19
	Pittsburgh CSC	11/17/17	6/30/19
	Portland OMSI ET	2/16/18	2/15/19
	Regina	2/16/18	2/15/19
	Richmond SMV	5/1/18	4/30/19
	Sacramento Imx	9/8/17	6/30/19
	Seattle PSC 2	11/10/17	
	Shanghai 3D STM	8/1/18	8/1/19
	Sioux Falls	12/2/17	6/30/19
	Tallahassee CLC	4/28/17	6/30/19
	Vancouver TWS	**12/22/17**	**6/30/19**
	Victoria DCI	4/14/17	6/30/19
	Washington NASM	4/21/18	12/31/18
Amazon	Hartberg	3/25/15	12/31/18
AMJ	Albuquerque NMMNH	7/16/18	7/15/19
	Chandigarh	6/15/18	6/14/20
	Chattanooga TA	**6/22/18**	**6/21/19**
	Cleveland	3/23/18	3/22/19
	Columbus COSI	5/25/18	5/24/19
	Dearborn THF	2/16/18	2/15/19
	Denver MNS	2/16/18	2/15/19
	Fort Worth	2/16/18	2/15/19
	Galveston	3/1/18	2/18/19
	Hague	7/3/18	7/2/19
	Hampton VASC	10/1/18	9/30/19
	Hastings	6/21/18	6/20/19
	Indianapolis Imx	6/8/18	6/7/19
	Leon Exp	6/1/18	11/30/18
	Lubbock SS	7/6/18	7/6/19
	Lucerne	9/1/18	9/1/19
	Melbourne MV	**8/23/18**	
	Memphis Pink	8/11/18	8/10/19
	Mexicali	9/22/18	3/21/19
	Mexico City Pap	3/15/18	3/14/19
	Montreal SC	5/18/18	5/17/19
	Moscow Kin	4/15/18	4/14/19
	Paris Geo	3/7/18	3/6/19
	Peoria RM	2/16/18	2/15/19
	Raleigh	9/1/18	8/31/19
	Regina	5/11/18	5/12/19
	Saint Augustine	6/1/18	5/30/19
	San Jose Tech	2/17/18	2/16/19
	Seattle PSC 2	9/7/18	9/6/19
	Tallahassee CLC	2/16/18	2/15/19
	Tijuana	3/1/18	2/28/19
	Valencia Spn	7/1/18	6/3/19
	Vancouver TWS	3/17/18	3/16/19
	Victoria DCI	3/9/18	3/8/19
AMMM	Melbourne MV	7/11/16	
Animalop	Stockholm	10/1/17	10/1/19
AOTE	Galveston	11/17/18	11/30/19
	Phoenix ASC	12/26/17	12/31/18
	Portland OMSI ET	1/26/18	1/31/19
	Saint Félicien	4/1/18	11/30/19
Arabia	**Gatineau**	**4/24/18**	**3/30/20**
AsterME	Atlanta FMNH	1/11/18	1/10/20
	Garden City	5/19/17	6/18/20
BackWild	Charlotte DP	11/24/18	11/23/19
	Chattanooga TA	3/16/18	3/15/19
	Columbus COSI	5/24/18	11/24/18
	Dearborn THF	8/1/18	7/31/19
	Erie	**8/4/18**	**6/30/19**
	Fort Lauderdale	6/1/18	5/31/20
	Fort Worth	**11/2/18**	**5/30/19**
	Galveston	8/21/18	2/28/19
	Garden City	9/25/18	9/24/19
	Gatineau	6/1/18	5/31/19
	Jersey City	8/4/18	8/3/19
	Lehi	**5/24/18**	**5/24/20**
	Louisville KSC	3/23/18	3/22/19
	Lubbock SS	**11/9/18**	**5/30/19**
	New York AMNH	9/14/18	3/13/19
	Omaha Zoo	**11/1/18**	**4/30/19**
	Orlando SC	**11/1/18**	**10/31/19**
	Pittsburgh CSC	8/31/18	6/30/19
	Portland OMSI ET	9/7/18	9/6/19
	Raleigh	6/4/18	6/3/19
	San Diego NHM	8/1/18	2/28/19
	Sudbury	9/4/18	6/30/19
	Tallahassee CLC	**10/18/18**	**10/18/19**
	Virginia Beach AMSC	**6/30/18**	**12/31/19**
Bugs	Columbus COSI	9/15/14	6/30/19
	Davenport Put	10/1/12	4/28/20
	Dubai Vox	2/1/17	1/30/19
	Edmonton TWS	6/30/18	6/30/19
	San Diego RHF	7/1/14	6/30/19
ConqOTS	Austin TSHM	3/1/18	2/28/19
	Salt Lake City Clark	4/7/18	11/9/18
CRA	Fort Worth	6/10/17	9/30/19
	Garden City	11/1/17	12/31/18
	Hartberg	3/25/15	12/31/18
	Nanchang JTSC		12/30/18
	Toronto OSC	2/24/18	2/23/19
D-Day	Columbus COSI	3/9/18	3/9/19
	Columbus GA NIM	1/31/18	1/31/19
	Dayton	5/26/17	12/31/18
	Dearborn THF	2/27/17	2/28/19
	Edmonton TWS	3/1/18	12/31/18
	Gatineau	9/1/15	3/31/19
	Hampton VASC	10/17/18	10/17/19
	Hastings	5/15/15	12/31/18
	Hutchinson	12/31/17	1/31/20
	Pensacola NAM	7/1/18	12/31/18
	Raleigh	5/23/14	2/1/19
	Seattle PSC 2	3/29/14	6/30/19
	Washington NASM	5/23/17	5/22/19
DIA	Harrisburg	1/1/16	12/31/18
DinoAliv	Fort Worth	7/15/16	9/30/19
	Houston MNS	7/1/17	6/30/19
	Kansas City Sci	7/3/18	7/31/19
	Portland OMSI ET	1/26/18	1/31/19
	Syracuse MOST	10/5/18	1/31/19
Dolphins	Fort Worth	5/28/16	9/30/19
	Gatineau	7/9/18	3/20/20
	Rochester MSC	12/1/17	12/31/18
	Speyer Dome		12/30/18
DreamBig	Austin TSHM	10/1/17	9/1/19
	Baltimore MSC	2/17/17	6/30/19
	Baton Rouge LASM	6/30/17	12/30/18
	Birmingham AL	2/17/17	2/28/19
	Bradford	1/1/18	12/31/19
	Chantilly	2/17/17	2/16/20
	Charlotte DP	**8/26/17**	**12/31/19**
	Cleveland	3/17/17	2/18/19
	Davenport Put	2/24/17	12/31/18
	Dearborn THF	2/17/17	12/31/18
	Edmonton TWS	3/25/17	2/28/19
	Fort Lauderdale	2/17/17	2/17/19
	Fort Worth	2/17/17	6/30/19
	Garden City	**12/1/17**	**12/31/19**
	Grand Rapids Cel	7/15/17	7/31/19
	Guayaquil	4/16/18	4/15/19
	Hampton VASC	2/17/17	2/17/19
	Harrisburg	2/18/17	2/18/19
	Hastings	**10/19/17**	**10/1/19**
	Houston MNS	2/17/17	12/31/19
	Jersey City	2/17/17	12/31/19
	Kaohsiung NSTM	**7/1/18**	**12/31/18**
	Lansing Cel	6/30/17	7/31/19
	London SM	9/4/17	8/31/19
	Lubbock SS	2/2/18	2/1/19
	Memphis Pink	2/10/18	3/2/19
	Mexico City Pap	3/15/17	12/31/18
	Monterrey Pap	2/2/18	2/1/19
	Moscow Kin	**9/10/17**	**6/1/19**
	Mount Pleasant Cel	**7/15/17**	**7/31/19**
	Muskegon Cel	**7/15/17**	**7/31/19**
	Philadelphia FI	3/1/18	2/28/19
	Pittsburgh CSC	**11/17/17**	**12/31/19**
	Portage Cel	**6/30/17**	**7/31/19**
	Portland OMSI ET	2/17/17	3/1/19
	Raleigh	2/17/17	12/31/18
	Regina	**2/17/17**	**12/31/19**
	Richmond SMV	2/18/17	12/31/18
	Saint Paul SMM	3/2/18	12/31/18
	San Diego RHF	3/10/17	4/1/19
	San Jose Tech	**2/17/17**	**11/1/19**
	Seattle PSC 2	**2/17/17**	**6/30/19**
	Shanghai 3D STM	**9/19/17**	**12/30/18**
	Singapore DC	10/1/18	4/1/19
	Sioux Falls	6/2/17	6/30/19
	Stockholm	3/15/18	3/15/19
	Sudbury	2/17/17	6/30/19
	Thessaloniki	**10/28/17**	**10/2/19**
	Valencia Spn	4/1/18	6/30/19
	Victoria DCI	**3/17/17**	**12/31/19**
	Washington NASM	2/17/17	2/16/20
DSC	**Davenport Put**	**2/6/15**	**3/9/19**
	Dearborn THF	**3/25/16**	**1/31/19**
	Edmonton TWS	9/14/18	9/23/19
	McMinnville	6/16/16	
	Portland OMSI ET	**1/16/15**	**4/28/19**
EarthFli	Atlanta FMNH	6/21/18	6/30/19

Film	Theater	Open	Close
	Erie	4/1/18	3/31/19
	Orlando SC	4/1/18	4/30/19
Electrop	Columbus COSI	4/1/17	3/30/19
Everest	Athens Eug	10/1/18	2/28/19
	Chandigarh	6/15/18	6/14/20
	Gatineau	7/30/18	3/30/20
	Hartberg		12/31/18
ExtrWeat	Aguascalientes	5/26/18	11/26/18
	Calgary TS	9/1/17	9/1/20
	Davenport Put	10/15/16	10/14/19
	Detroit MSC	5/22/17	12/31/18
	Edmonton TWS	6/2/17	6/1/19
	Garza Garcia	3/1/18	6/30/19
	Huntsville USSRC	4/1/18	4/1/19
	Kansas City Sci	10/15/16	10/14/19
	Kuwait SCK	11/1/17	4/30/19
	Memphis Pink	3/24/17	8/31/19
	Philadelphia FI	2/11/17	2/11/19
	Sacramento Imx	2/24/17	
	Saint Augustine	10/15/16	10/14/19
	Saint Louis SC	1/13/17	12/12/18
	Tallahassee CLC	5/19/17	5/1/20
	Tijuana	7/28/17	6/1/19
FightPil	Chantilly	12/10/04	
	Corpus Christi Lex	5/12/12	
	Dayton	3/1/13	
	Huntsville USSRC	7/1/13	
	McMinnville	3/23/12	
FlyMons	Charlotte DP	5/26/18	12/31/19
	Columbus COSI	7/17/17	7/30/19
	Davenport Put	3/27/14	6/1/20
	Edmonton TWS	1/4/16	1/1/19
	Kenner	6/4/16	6/3/20
	Killeen	9/15/17	9/15/20
	Moscow Kin	10/1/16	12/31/18
	Portland OMSI ET	5/22/14	4/9/19
FON	Hague	10/4/12	10/3/20
	Louisville KSC	6/18/15	7/2/20
	Melbourne MV	9/1/15	12/31/18
FOTB	Atlanta FMNH	11/2/18	5/2/19
	Austin TSHM	10/1/16	12/31/18
	Columbus COSI	9/1/14	6/30/19
	Davenport Put	2/15/13	6/30/19
	Dearborn THF	2/8/17	12/31/18
	Edmonton TWS	12/26/13	6/30/19
	Gatineau	10/5/12	6/30/19
	Harrisburg	2/2/14	6/30/19
	Hastings	3/17/13	6/30/19
	Louisville KSC	9/30/12	6/30/19
	Peoria RM	4/1/16	6/30/19
	Portland OMSI ET	1/7/14	6/30/19
	Raleigh	10/19/17	6/30/19
	Richmond SMV	5/1/13	6/30/19
	Sacramento Imx	8/13/13	5/31/19
	Saint Augustine	1/18/13	6/30/19
	San Diego RHF	10/12/12	6/30/19
	Tallahassee CLC	1/18/13	6/30/19
	Victoria DCI	4/5/13	6/30/19
G3DNW	Edmonton TWS	10/22/18	1/24/19
	Hastings	2/10/15	6/10/19
	Orlando SC	7/5/14	1/4/19
	Philadelphia FI	9/6/16	12/31/18
	Prague CC	5/22/14	5/21/19
	Salt Lake City Clark	**11/1/18**	**10/31/19**
	Virginia Beach AMSC	5/28/16	12/31/18
GBR3D	**Atlanta FMNH**	**12/15/18**	**12/14/19**
	Atlantic City	7/1/18	3/1/19
	Boston MOS	7/5/18	7/4/19
	Cleveland	8/1/18	7/31/19
	Edmonton TWS	7/1/18	6/30/19
	Fort Lauderdale	10/5/18	10/4/19
	Harrisburg	7/6/18	7/5/19
	Jersey City	**11/23/18**	**11/22/19**
	Saint Augustine	8/20/18	8/19/20
	Salt Lake City Clark	7/21/18	3/29/19
	San Diego RHF	7/5/18	7/5/19
GC	Grand Canyon DCI	11/1/99	12/19
GCA	Grand Rapids Cel	9/1/18	7/31/19
	Hartberg	3/25/15	12/31/18
	Portage Cel	9/1/18	7/31/19
	Richmond SMV	6/1/16	7/31/19
GlobSoun	Charlotte DP	11/1/17	11/1/19
Greece	Beijing Dome CSTM	1/15/18	1/14/19
	Lucknow	12/1/17	11/30/18
Gruffalo	Saint Augustine	1/1/15	12/31/18
GruffChi	Saint Augustine	2/1/15	12/31/18
GWS	Boston NEA	5/31/13	6/30/19
	Gatineau	10/7/16	3/31/20
	Hague	4/1/18	4/30/19
	Hutchinson	7/1/17	12/31/19
	Portland OMSI ET	1/26/18	1/31/19
	Sacramento Imx	2/20/15	6/30/19
	San Jose Tech	10/31/18	1/31/20
HCBTD	San Simeon DCI	8/17/96	
HidUniv	Glasgow		12/30/18
	Hampton VASC	9/7/18	12/31/19
	Lansing Cel	7/1/18	7/31/19
	Parker	7/29/18	7/21/19
HOTB	New Orleans	9/15/15	12/31/18
HumpbWha	Albuquerque NMMNH	12/1/17	11/30/18
	Apple Valley Imx	7/12/18	7/12/19
	Baltimore MSC	7/1/15	7/12/19
	Boston MOS	**2/13/15**	**12/31/19**
	Grand Rapids Cel	9/1/18	7/31/19
	Indianapolis Imx	8/17/16	6/5/19
	Keelung NMMST	7/1/18	6/30/19
	Leon Exp	**12/1/18**	**5/31/19**
	Mexico City PAP	11/16/16	11/30/18
	Milwaukee	2/1/18	1/30/19
	Nuremberg		12/31/18
	Pittsburgh CSC	6/17/16	12/31/18
	Portage Cel	9/1/18	7/31/19
	Richmond SMV	3/14/15	7/31/19
	Sacramento Imx	8/19/16	10/24/19
	Sudbury	9/24/15	
	Vancouver TWS	10/9/15	6/30/19
Hurrican	Hampton VASC	6/15/17	6/14/19
	Indianapolis Imx	2/9/18	2/8/19
	Port of Spain	4/26/18	4/25/19
	Victoria DCI	2/1/18	1/31/19
IncrPred	**Atlanta FMNH**	**9/30/17**	**12/31/19**
	Columbus COSI	9/22/18	9/30/19
	Lehi	9/29/17	9/30/19
	Phoenix ASC	10/19/18	10/31/19
	Victoria DCI	11/16/18	11/30/19
ISR	Huntsville USSRC	5/5/18	4/30/19
	Sioux Falls	5/4/18	4/30/19
Jerusale	Columbus GA NIM	10/18/13	2/7/19
	Galveston	11/12/15	4/22/19
	Jersey City	9/1/18	8/31/20
	Jerusalem YP	12/7/17	12/6/18
	Rishon YP	12/7/17	12/6/18
	Sacramento Imx	9/15/14	10/31/19
	Salt Lake City Clark	12/21/18	12/31/18
	San Jose Tech	3/15/15	6/20/19
	Speyer Dome	12/12/13	12/11/19
	Tijuana	4/1/15	3/14/19
	Washington NASM	10/23/17	12/31/18
JMCSO	Chattanooga TA	1/31/18	1/31/19
	Garza Garcia	11/1/18	2/28/19
	Port of Spain	2/7/17	2/28/19
	Portland OMSI ET	3/1/17	2/28/19
JTM	Edmonton TWS	12/26/13	6/30/19
	Hague		6/30/19
JTS	Athens Eug	11/29/17	12/31/18
	Columbus GA NIM	12/4/15	4/30/19
	Dayton	3/6/15	12/31/18
	Hampton VASC	2/21/15	2/20/19
	Indianapolis Imx	8/31/18	8/30/19
	KSC 1	2/27/15	
	Portland OMSI ET	3/20/15	3/21/19
	Toronto OSC	10/15/18	10/15/19
	Washington NASM	3/6/15	
JTTSP	**Boston MOS**	**1/17/14**	**12/31/18**
	Columbus COSI	11/26/16	3/8/19
	Copenhagen TBP	6/15/17	12/16/18
	Edmonton TWS	1/16/15	
	Memphis Pink	5/26/18	5/25/19
	Monterrey Pap	6/10/16	12/31/18
	Speyer Dome	5/25/17	12/31/18
	Stockholm		12/31/18
Kenya	Hutchinson	5/30/15	6/30/19
L&C	Baton Rouge LASM	11/3/15	11/2/18
	Davenport Put		4/26/20
	Saint Augustine		6/14/19
	San Jose Tech	6/8/16	6/20/19
LastReef	Davenport Put	7/1/15	6/30/19
	Louisville KSC	2/8/14	6/30/19
	Sacramento Imx	5/20/16	6/30/19
	Sioux Falls	1/30/15	6/30/19
LBC	Salt Lake City Clark	12/21/18	12/31/18
LITAOA	Chantilly	5/1/15	
	Davenport Put	7/1/16	10/1/20
	Hutchinson	**5/1/15**	**7/19**
	Lehi	4/10/15	7/30/19
	McMinnville	4/10/15	5/30/19
	Saint Paul SMM	10/12/18	3/10/19
	Washington NASM	4/10/15	
LivingSe	Hartberg	10/1/13	12/31/18
LOF	McMinnville	3/23/12	
MA	Atlanta FMNH	2/9/18	2/8/19
	Guangzhou GSC	12/1/17	11/30/18
	Hangzhou LCSTM	12/1/17	11/30/18
	Melbourne MV	1/30/17	1/28/19
	Shanghai 3D STM	12/1/17	11/30/18
Meerkats	**Sioux Falls**	**6/1/18**	**12/31/18**
MOC	Alamogordo	3/31/18	3/31/19
	Columbus COSI	4/1/17	3/31/19
	Edmonton TWS	1/27/17	12/31/18
	Gatineau	1/10/18	1/31/19
	Jersey City	11/1/17	12/31/18
	Sioux Falls	1/25/18	1/31/19
	Sudbury	9/7/17	10/31/19
MOE	Los Angeles CSC	3/24/18	1/6/19
	Portland OMSI ET	10/6/18	1/27/19
	Victoria DCI	5/18/18	12/31/18
MOF	Pensacola NAM	11/8/96	
	Speyer Dome	12/1/97	12/31/18
MOTUW	Bradford	4/12/14	6/30/19
	Copenhagen TBP	6/19/14	6/18/19
	Davenport Put	2/1/14	1/31/19
	Dubai Vox	2/1/17	3/30/19
	Mumbai Ino	1/1/18	12/31/19
	Poitiers Imax 3D	2/1/16	1/31/19
	Tallahassee CLC	3/17	3/20
	Victoria DCI	10/9/15	11/8/18
MounQues	Milwaukee	10/1/18	9/30/19
Mummies	Baton Rouge LASM	3/1/17	3/31/19
	Melbourne MV	9/22/17	9/30/19
	Peoria RM	10/16/18	10/31/20
	Portland OMSI ET	1/26/18	3/31/19
	Sacramento Imx	1/1/17	6/30/19
	Vancouver TWS	7/1/17	6/30/19
ND	New Delhi ICC		
Niagara	Niagara Can DCI	7/1/86	
	Niagara NY DCI	5/1/07	
NPA	Albuquerque NMMNH	4/2/18	4/1/19
	Baltimore MSC	7/1/18	6/30/19
	Branson	3/18/16	12/31/18
	Carnival Horizon	4/1/18	10/5/19
	Columbus COSI	3/8/18	3/8/19
	Columbus GA NIM	4/1/16	5/9/19
	Daqing STM	1/1/18	12/31/18
	Edmonton TWS	2/12/16	10/15/19
	Fort Worth	2/12/16	5/31/19
	Grand Canyon DCI	3/16/18	3/8/19
	Grand Rapids Cel	10/1/18	7/31/19
	Hague	2/16/16	12/31/18
	Hampton VASC	4/29/16	4/29/19
	Harrisburg	**7/1/16**	**7/1/19**
	Hastings	6/9/16	7/1/19
	Hong Kong SM	9/8/18	2/28/19
	Houston MNS	7/1/18	12/31/19
	Indianapolis Imx	2/12/16	12/31/18
	Jersey City	2/12/16	6/24/19
	Lansing Cel	10/1/18	7/31/19
	London BFI Ode	2/12/16	7/1/19
	Lucerne	3/17/16	11/30/18
	Mexicali	**4/22/18**	**4/23/19**
	Mobile	5/26/18	5/25/19
	Moscow Kin	**9/17/16**	**12/1/19**
	Nuremberg	3/10/16	12/31/18
	Orlando SC	2/12/16	11/17/18
	Pittsburgh CSC	**2/12/16**	**12/31/19**
	Portage Cel	10/1/18	7/31/19
	Portland OMSI ET	2/12/16	3/1/19
	Richmond SMV	4/10/16	4/30/19
	Saint Louis SC	2/12/16	3/31/19
	San Diego NHM	**12/1/18**	**8/31/19**
	San Jose Tech	**2/12/16**	**11/1/19**
	Sinsheim	**3/4/16**	**12/30/18**
	Sudbury	**2/12/16**	**6/30/19**
	Valencia Spn	**10/7/16**	**6/30/19**
	Vancouver TWS	2/12/16	6/30/19
	Yellowstone	5/1/16	2/11/19

Film	Theater	Open	Close
OOBP	Al Khobar	8/15/18	8/30/19
	Atlanta FMNH	8/3/18	8/30/19
	Birmingham AL	9/30/18	9/30/19
	Boston NEA	3/20/18	3/31/19
	Charlotte DP	6/1/18	6/30/19
	Chattanooga TA	3/1/18	3/31/19
	Chicago MSI	3/16/18	3/31/19
	Columbus COSI	9/22/18	9/30/19
	Davenport Put	3/16/18	3/31/19
	Denver MNS	9/1/18	9/30/19
	Galveston	5/1/18	5/31/19
	Hague	7/13/18	7/31/19
	Houston MNS	3/30/18	3/31/19
	Jersey City	6/25/18	6/30/19
	Kuwait SCK	8/20/18	5/31/19
	Lehi	3/16/18	3/31/19
	London BFI Ode	9/7/18	6/30/19
	Louisville KSC	8/15/18	6/15/19
	Lubbock SS	5/1/18	5/31/19
	Lucerne	6/1/18	6/30/19
	Melbourne MV	3/21/18	3/31/19
	Milwaukee	6/14/18	6/30/19
	Montreal SC	6/1/18	6/30/19
	New Orleans	3/30/18	3/31/19
	Norwalk MA	10/5/18	10/31/19
	Omaha Zoo	3/30/18	3/31/19
	Orlando SC	4/16/18	4/30/19
	Paris Geo	6/20/18	12/31/18
	Peoria RM	9/28/18	9/30/19
	Philadelphia FI	5/1/18	5/1/19
	Phoenix ASC	5/4/18	5/31/19
	Portland OMSI ET	4/20/18	4/30/19
	Richmond SMV	6/1/18	6/30/19
	San Diego RHF	3/1/18	3/31/19
	Seattle PSC 2	4/20/11	4/30/19
	Tijuana	4/1/18	4/30/19
	Toronto OSC	6/15/18	6/30/19
	Victoria DCI	7/1/18	7/31/19
Ozarks	Branson	9/93	12/18
Pandas	Salt Lake City Clark	5/19/18	3/29/19
Penguins	Milwaukee	10/23/17	6/20/19
PlanPowe	**Kuwait SCK**	**12/10/18**	**2/28/19**
PTJH	Dubai Vox	2/1/17	1/30/19
	Louisville KSC	7/4/14	7/20/20
Pulse	Vancouver TWS	7/1/17	6/30/19
Rescue	McMinnville	6/1/12	
RobotsNG	Columbus COSI	1/15/16	1/31/19
	Davenport Put	11/1/15	12/31/18
	Dearborn THF	3/25/16	1/31/19
	Hampton VASC	6/20/15	6/19/19
	Hutchinson	5/20/16	6/12/19
	McMinnville	11/6/15	5/30/19
	Mumbai Ino	1/1/18	1/1/19
	Portland OMSI ET	3/15/18	3/17/19
	Regina	9/1/18	9/1/19
	Tallahassee CLC	10/16/15	11/8/18
ROTB	Saint Augustine	10/3/15	12/31/18
	Virginia Beach AMSC	10/26/18	10/28/19
SeaMonst	**Dubai Vox**	**2/1/17**	**1/30/19**
	Portland OMSI ET	**1/15/14**	**4/28/19**
SFLIS	Copenhagen TBP	2/9/17	2/9/19
	Dongguan STM	1/1/18	12/31/18
	Paris Geo	1/30/18	1/29/19
	Salt Lake City Clark	**2/16/18**	**2/15/19**
	Taichung NMNS	7/1/17	12/30/18
	Victoria DCI	**9/22/17**	**12/31/19**
SOE	Chicago MSI	5/25/18	5/25/19
	Copenhagen TBP	7/15/18	7/15/19
	Salt Lake City Clark	11/10/18	11/9/19
	Victoria DCI	9/11/18	
SOG	Baton Rouge LASM	1/1/18	12/31/18
SpaceNex	Calgary TS	1/1/17	12/31/18
	Huntsville USSRC	**3/1/16**	**2/1/19**
	Hutchinson	9/8/17	3/30/19
	Singapore SC	6/1/18	6/1/19
TA	Chicago MSI	5/31/18	5/31/19
	Davenport Put	7/1/14	6/30/19
	Fort Worth	3/1/17	9/30/19
	Louisville KSC	2/1/16	7/31/19
	Portland OMSI ET	1/26/18	1/31/19
TinyGian	Davenport Put	9/25/15	6/30/19
	Gatineau	12/23/16	3/31/19
	Harrisburg	2/1/18	2/28/19
	Louisville KSC	9/21/17	9/30/19
	Melbourne MV	9/22/17	9/30/19
	Memphis Pink	11/17/18	5/22/20
	Peoria RM	6/30/18	6/30/20
	Pittsburgh CSC	**11/15/17**	**11/30/19**
	Poitiers Imax	4/1/16	4/30/19
	Sioux Falls	7/1/17	6/30/19
	Sudbury	6/24/16	5/31/19
	Tallahassee CLC	1/6/16	7/31/19
TLR	Sacramento Imx	5/20/16	6/30/19
	Sioux Falls	7/1/17	6/30/19
TO FLY	Washington NASM	7/1/76	12/31/18
ToFly	Washington NASM	3/7/16	12/31/18
TOTIA	Atlanta FMNH	6/15/17	6/30/19
	Davenport Put	2/1/15	6/30/19
	Hutchinson	7/1/17	12/31/19
	Louisville KSC	6/30/18	7/31/19
	Melbourne MV	9/22/17	9/30/19
	Milwaukee	6/14/18	6/30/19
	New Orleans	7/1/17	6/30/19
	Phoenix ASC	**12/1/18**	**12/31/19**
	San Diego NHM	1/3/18	3/31/19
	Stockholm		12/31/18
	Vancouver TWS	7/1/17	12/31/18
TTA	Glasgow	4/1/15	4/10/19
	Grand Rapids Cel	6/2/18	7/31/19
	Moscow Kin	**11/1/16**	**12/1/19**
	Portage Cel	6/1/18	7/31/19
	Prague CC	12/8/17	12/1/18
TurtOdys	Apple Valley Imx	11/9/18	5/8/19
	Hastings	9/13/18	5/30/19
	Lehi	7/13/18	7/12/19
	Port of Spain	9/27/18	9/26/19
	Sacramento Imx	9/21/18	3/20/19
	Seattle PSC 2	**12/7/18**	**5/31/19**
	Sioux Falls	9/1/18	1/31/19
	Sudbury	**12/7/18**	**12/6/19**
	Virginia Beach AMSC	**6/30/18**	**12/31/19**
TurtTale	Al Khobar	11/1/18	1/31/19
	Katowice CC		9/30/19
	Krakow CC		9/30/19
	Lodz CC		9/30/19
	Poznan CC		9/30/19
	Warsaw CC		9/30/19
	Wroclaw CC		9/30/19
VanGogh	Gatineau	7/30/18	3/30/20
Vikings	Philadelphia FI	10/13/18	10/1/19
Volcanoes	Albuquerque NMMNH	10/15/18	10/14/19
	Boston MOS	11/9/18	
	Cincinnati MC	12/21/18	
	Davenport Put	11/9/18	11/8/19
	Edmonton TWS	10/12/18	10/11/19
	Houston MNS	11/9/18	
	Kagoshima	**12/18**	**12/19**
	Lehi	10/13/18	10/12/19
	Portland OMSI ET	10/13/18	10/12/19
	Vancouver TWS	11/17/18	9/30/19
WATE	Katoomba	6/1/97	
Wild Ocean	New Orleans	7/1/17	6/30/19
WildAfri	Apple Valley Imx	2/1/16	6/30/19
	Charlotte DP	9/19/18	9/30/19
	Davenport Put	8/20/17	9/30/19
	Houston MNS	6/1/16	6/30/19
	Las Palmas	7/15/18	7/31/19
	Lucerne	9/21/17	9/30/19
	Melbourne MV	1/4/18	1/31/19
	New Orleans	9/21/18	12/20/18
	Phoenix ASC	3/2/18	3/31/19
	Portland OMSI ET	1/26/18	1/31/19
	Richmond SMV	2/1/17	
	Tallahassee CLC	5/15/16	6/30/19
WildOcea	New Orleans	7/1/17	6/30/19
WM	Cleveland	6/15/18	6/1/19
WOTA	Charlotte DP	2/18/18	2/28/19
	Galveston	11/17/18	11/30/19
	Gatineau	3/15/18	3/31/19
	Saint Félicien	4/1/18	11/30/19
	San Diego RHF	**12/7/18**	**12/31/19**
	Vancouver TWS	7/1/17	6/30/19
WTTR3D	Houston MNS	4/1/18	5/31/19
WWDPP3D	Bradford	9/16/15	9/30/19
	Edmonton TWS	5/1/15	5/31/19
	Erie	9/15/16	12/15/19
	Melbourne MV	9/22/17	9/30/19
	New Orleans	6/22/18	12/31/18
	Peoria RM	6/30/18	6/30/19
	Portland OMSI ET	1/26/18	1/31/19
	Tallahassee CLC	4/19/16	7/31/19
	Valencia Spn	7/1/16	3/31/19

Nov.-Dec. 2018 by Theater

Theater	Film	Open	Close
Aguascalientes	ExtrWeat	5/26/18	11/26/18
Al Khobar	OOBP	8/15/18	8/30/19
	TurtTale	11/1/18	1/31/19
Alamogordo	MOC	3/31/18	3/31/19
Albuquerque NMMNH	AMJ	7/16/18	7/15/19
	HumpbWha	12/1/17	11/30/18
	NPA	4/2/18	4/1/19
	Volcanoes	10/15/18	10/14/19
Apple Valley Imx	HumpbWha	7/12/18	7/12/19
	TurtOdys	11/9/18	5/8/19
	WildAfri	2/1/16	6/30/19
Athens Eug	Everest	10/1/18	2/28/19
	JTS	11/29/17	12/31/18
Atlanta FMNH	AsterME	1/11/18	1/10/20
	EarthFli	6/21/18	6/30/19
	FOTB	11/2/18	5/2/19
	GBR3D	**12/15/18**	**12/14/19**
	IncrPred	**9/30/17**	**12/31/19**
	MA	2/9/18	2/8/19
	OOBP	8/3/18	8/30/19
	TOTIA	6/15/17	6/30/19
Atlantic City	GBR3D	7/1/18	3/1/19
Austin TSHM	AmazAdve	9/1/18	8/15/19
	ConqOTS	3/1/18	2/28/19
	DreamBig	10/1/17	9/1/19
	FOTB	10/1/16	12/31/18
Baltimore MSC	DreamBig	2/17/17	6/30/19
	HumpbWha	7/1/15	7/12/19
	NPA	7/1/18	6/30/19
Baton Rouge LASM	DreamBig	6/30/17	12/30/18
	L&C	11/3/15	11/2/18
	Mummies	3/1/17	3/31/19
	SOG	1/1/18	12/31/18
Beijing 3D CSTM	AmazAdve	2/6/18	2/15/19
Beijing Dome CSTM	Greece	1/15/18	1/14/19
Birmingham AL	DreamBig	2/17/17	2/28/19
	OOBP	9/30/18	9/30/19
Boston MOS	GBR3D	7/5/18	7/4/19
	HumpbWha	**2/13/15**	**12/31/19**
	JTTSP	**1/17/14**	**12/31/18**
	Volcanoes	11/9/18	
Boston NEA	GWS	5/31/13	6/30/19
	OOBP	3/20/18	3/31/19
Bradford	DreamBig	1/1/18	12/31/19
	MOTUW	4/12/14	6/30/19
	WWDPP3D	9/16/15	9/30/19
Branson	NPA	3/18/16	12/31/18
	Ozarks	9/93	12/18
Calgary TS	ExtrWeat	9/1/17	9/1/20
	SpaceNex	1/1/17	12/31/18
Carnival Horizon	NPA	4/1/18	10/5/19
Chandigarh	AMJ	6/15/18	6/14/20
	Everest	6/15/18	6/14/20
Chantilly	DreamBig	2/17/17	2/16/20
	FightPil	12/10/04	
	LITAOA	5/1/15	
Charlotte DP	AmazAdve	5/1/17	6/30/19
	BackWild	11/24/18	11/23/19
	DreamBig	**8/26/17**	**12/31/19**
	FlyMons	5/26/18	12/31/19
	GlobSoun	11/1/17	11/1/19
	OOBP	6/1/18	6/30/19
	WildAfri	9/19/18	9/30/19

Theater	Film	Open	Close
	WOTA	2/18/18	2/28/19
Chattanooga TA	**AMJ**	**6/22/18**	**6/21/19**
	BackWild	3/16/18	3/15/19
	JMCSO	1/31/18	1/31/19
	OOBP	3/1/18	3/31/19
Chicago MSI	AmazAdve	5/26/17	6/30/19
	OOBP	3/16/18	3/31/19
	SOE	5/25/18	5/25/19
	TA	5/31/18	5/31/19
Cincinnati MC	Volcanoes	12/21/18	
Cleveland	AmazAdve	1/9/18	6/30/19
	AMJ	3/23/18	3/22/19
	DreamBig	3/17/17	2/18/19
	GBR3D	8/1/18	7/31/19
	WM	6/15/18	6/1/19
Columbus COSI	AmazAdve	1/10/18	6/30/19
	AMJ	5/25/18	5/24/19
	BackWild	5/24/18	11/24/18
	Bugs	9/15/14	6/30/19
	D-Day	3/9/18	3/9/19
	Electrop	4/1/17	3/30/19
	FlyMons	7/17/17	7/30/19
	FOTB	9/1/14	6/30/19
	IncrPred	9/22/18	9/30/19
	JTTSP	11/26/16	3/8/19
	MOC	4/1/17	3/31/19
	NPA	3/8/18	3/8/19
	OOBP	9/22/18	9/30/19
	RobotsNG	1/15/16	1/31/19
Columbus GA NIM	D-Day	1/31/18	1/31/19
	Jerusale	10/18/13	2/7/19
	JTS	12/4/15	4/30/19
	NPA	4/1/16	5/9/19
Copenhagen TBP	JTTSP	6/15/17	12/16/18
	MOTUW	6/19/14	6/18/19
	SFLIS	2/9/17	2/9/19
	SOE	7/15/18	7/15/19
Corpus Christi Lex	ACGOTS	6/17/16	
	FightPil	5/12/12	
Daqing STM	AmazAdve	2/16/18	2/15/19
	NPA	1/1/18	12/31/18
Davenport Put	Bugs	10/1/12	4/28/20
	DreamBig	2/24/17	12/31/18
	DSC	**2/6/15**	**3/9/19**
	ExtrWeat	10/15/16	10/14/19
	FlyMons	3/27/14	6/1/20
	FOTB	2/15/13	6/30/19
	L&C		4/26/20
	LastReef	7/1/15	6/30/19
	LITAOA	7/1/16	10/1/20
	MOTUW	2/1/14	1/31/19
	OOBP	3/16/18	3/31/19
	RobotsNG	11/1/15	12/31/18
	TA	7/1/14	6/30/19
	TinyGian	9/25/15	6/30/19
	TOTIA	2/1/15	6/30/19
	Volcanoes	11/9/18	11/8/19
	WildAfri	8/20/17	9/30/19
Dayton	ACGOTS	6/17/16	12/31/18
	D-Day	5/26/17	12/31/18
	FightPil	3/1/13	
	JTS	3/6/15	12/31/18
Dearborn THF	AmazAdve	3/2/18	2/28/19
	AMJ	2/16/18	2/15/19
	BackWild	8/1/18	7/31/19
	D-Day	2/27/17	2/28/19
	DreamBig	2/17/17	12/31/18
	DSC	**3/25/16**	**1/31/19**
	FOTB	2/8/17	12/31/18
	RobotsNG	3/25/16	1/31/19
Denver MNS	AMJ	2/16/18	2/15/19
	OOBP	9/1/18	9/30/19
Detroit MSC	ExtrWeat	5/22/17	12/31/18
Dongguan STM	SFLIS	1/1/18	12/31/18
Dubai Vox	Bugs	2/1/17	1/30/19
	MOTUW	2/1/17	3/30/19
	PTJH	2/1/17	1/30/19
	SeaMonst	**2/1/17**	**1/30/19**
Edmonton TWS	AmazAdve	1/19/18	6/30/19
	Bugs	6/30/18	6/30/19
	D-Day	3/1/18	12/31/18
	DreamBig	3/25/17	2/28/19
	DSC	9/14/18	9/23/19
	ExtrWeat	6/2/17	6/1/19
	FlyMons	1/4/16	1/1/19
	FOTB	12/26/13	6/30/19
	G3DNW	10/22/18	1/24/19
	GBR3D	7/1/18	6/30/19
	JTM	12/26/13	6/30/19
	JTTSP	1/16/15	
	MOC	1/27/17	12/31/18
	NPA	2/12/16	10/15/19
	Volcanoes	10/12/18	10/11/19
	WWDPP3D	5/1/15	5/31/19
Erie	**AmazAdve**	**6/30/18**	**6/30/19**
	BackWild	**8/4/18**	**6/30/19**
	EarthFli	4/1/18	3/31/19
	WWDPP3D	9/15/16	12/15/19
Fort Lauderdale	BackWild	6/1/18	5/31/20
	DreamBig	2/17/17	2/17/19
	GBR3D	10/5/18	10/4/19
Fort Worth	AMJ	2/16/18	2/15/19
	BackWild	**11/2/18**	**5/30/19**
	CRA	6/10/17	9/30/19
	DinoAliv	7/15/16	9/30/19
	Dolphins	5/28/16	9/30/19
	DreamBig	2/17/17	6/30/19
	NPA	2/12/16	5/31/19
	TA	3/1/17	9/30/19
Galveston	AMJ	3/1/18	2/18/19
	AOTE	11/17/18	11/30/19
	BackWild	8/21/18	2/28/19
	Jerusale	11/12/15	4/22/19
	OOBP	5/1/18	5/31/19
	WOTA	11/17/18	11/30/19
Garden City	AsterME	5/19/17	6/18/20
	BackWild	9/25/18	9/24/19
	CRA	11/1/17	12/31/18
	DreamBig	**12/1/17**	**12/31/19**
Garza Garcia	ExtrWeat	3/1/18	6/30/19
	JMCSO	11/1/18	2/28/19
Gatineau	**AmazAdve**	**12/16/17**	**3/2/19**
	Arabia	**4/24/18**	**3/30/20**
	BackWild	6/1/18	5/31/19
	D-Day	9/1/15	3/31/19
	Dolphins	7/9/18	3/20/20
	Everest	7/30/18	3/30/20
	FOTB	10/5/12	6/30/19
	GWS	10/7/16	3/31/20
	MOC	1/10/18	1/31/19
	TinyGian	12/23/16	3/31/19
	VanGogh	7/30/18	3/30/20
	WOTA	3/15/18	3/31/19
Glasgow	HidUniv		12/30/18
	TTA	4/1/15	4/10/19
Grand Canyon DCI	GC	11/1/99	12/19
	NPA	3/16/18	3/8/19
Grand Rapids Cel	DreamBig	7/15/17	7/31/19
	GCA	9/1/18	7/31/19
	HumpbWha	9/1/18	7/31/19
	NPA	10/1/18	7/31/19
	TTA	6/2/18	7/31/19
Guangzhou GSC	MA	12/1/17	11/30/18
Guayaquil	AmazAdve	4/16/18	2/28/19
	DreamBig	4/16/18	4/15/19
Hague	AMJ	7/3/18	7/2/19
	FON	10/4/12	10/3/20
	GWS	4/1/18	4/30/19
	JTM		6/30/19
	NPA	2/16/16	12/31/18
	OOBP	7/13/18	7/31/19
Hampton VASC	ACGOTS	11/10/17	11/9/18
	AmazAdve	3/31/18	3/30/19
	AMJ	10/1/18	9/30/19
	D-Day	10/17/18	10/17/19
	DreamBig	2/17/17	2/17/19
	HidUniv	9/7/18	12/31/19
	Hurrican	6/15/17	6/14/19
	JTS	2/21/15	2/20/19
	NPA	4/29/16	4/29/19
	RobotsNG	6/20/15	6/19/19
Hangzhou LCSTM	MA	12/1/17	11/30/18
Harrisburg	DIA	1/1/16	12/31/18
	DreamBig	2/18/17	2/18/19
	FOTB	2/2/14	6/30/19
	GBR3D	7/6/18	7/5/19
	NPA	**7/1/16**	**7/1/19**
	TinyGian	2/1/18	2/28/19
Hartberg	Amazon	3/25/15	12/31/18
	CRA	3/25/15	12/31/18
	Everest		12/31/18
	GCA	3/25/15	12/31/18
	LivingSe	10/1/13	12/31/18
Hastings	AMJ	6/21/18	6/20/19
	D-Day	5/15/15	12/31/18
	DreamBig	**10/19/17**	**10/1/19**
	FOTB	3/17/13	6/30/19
	G3DNW	2/10/15	6/10/19
	NPA	6/9/16	7/1/19
	TurtOdys	9/13/18	5/30/19
Hong Kong SM	NPA	9/8/18	2/28/19
Houston MNS	**AmazAdve**	**4/21/17**	**12/31/19**
	DinoAliv	7/1/17	6/30/19
	DreamBig	2/17/17	12/31/19
	NPA	7/1/18	12/31/19
	OOBP	3/30/18	3/31/19
	Volcanoes	11/9/18	
	WildAfri	6/1/16	6/30/19
	WTTR3D	4/1/18	5/31/19
Huntsville USSRC	ExtrWeat	4/1/18	4/1/19
	FightPil	7/1/13	
	ISR	5/5/18	4/30/19
	SpaceNex	**3/1/16**	**2/1/19**
Hutchinson	ACGOTS	5/29/17	11/30/18
	AirRacer	1/19/18	1/31/19
	D-Day	12/31/17	1/31/20
	GWS	7/1/17	12/31/19
	Kenya	5/30/15	6/30/19
	LITAOA	**5/1/15**	**7/19**
	RobotsNG	5/20/16	6/12/19
	SpaceNex	9/8/17	3/30/19
	TOTIA	7/1/17	12/31/19
Indianapolis Imx	AmazAdve	9/8/17	6/7/19
	AMJ	6/8/18	6/7/19
	HumpbWha	8/17/16	6/5/19
	Hurrican	2/9/18	2/8/19
	JTS	8/31/18	8/30/19
	NPA	2/12/16	12/31/18
Jersey City	BackWild	8/4/18	8/3/19
	DreamBig	2/17/17	12/31/19
	GBR3D	**11/23/18**	**11/22/19**
	Jerusale	9/1/18	8/31/20
	MOC	11/1/17	12/31/18
	NPA	2/12/16	6/24/19
	OOBP	6/25/18	6/30/19
Jerusalem YP	Jerusale	12/7/17	12/6/18
Kagoshima	AmazAdve	10/10/18	12/31/18
	Volcanoes	**12/18**	**12/19**
Kansas City Sci	DinoAliv	7/3/18	7/31/19
	ExtrWeat	10/15/16	10/14/19
Kaohsiung NSTM	**DreamBig**	**7/1/18**	**12/31/18**
Katoomba	WATE	6/1/97	
Katowice CC	AfricAdv		9/30/19
	TurtTale		9/30/19
Keelung NMMST	HumpbWha	7/1/18	6/30/19
Kenner	FlyMons	6/4/16	6/3/20
Killeen	FlyMons	9/15/17	9/15/20
Krakow CC	AfricAdv		9/30/19
	TurtTale		9/30/19
KSC 1	JTS	2/27/15	
Kuwait SCK	**AmazAdve**	**6/14/18**	**12/31/19**
	ExtrWeat	11/1/17	4/30/19
	OOBP	8/20/18	5/31/19
	PlanPowe	**12/10/18**	**2/28/19**
Lansing Cel	DreamBig	6/30/17	7/31/19
	HidUniv	7/1/18	7/31/19
	NPA	10/1/18	7/31/19
Las Palmas	WildAfri	7/15/18	7/31/19
Lehi	**BackWild**	**5/24/18**	**5/24/20**
	IncrPred	9/29/17	9/30/19
	LITAOA	4/10/15	7/30/19
	OOBP	3/16/18	3/31/19
	TurtOdys	7/13/18	7/12/19
	Volcanoes	10/13/18	10/12/19
Leon Exp	AMJ	6/1/18	11/30/18
	HumpbWha	**12/1/18**	**5/31/19**
Lodz CC	AfricAdv		9/30/19
	TurtTale		9/30/19
London BFI Ode	NPA	2/12/16	7/1/19
	OOBP	9/7/18	6/30/19
London SM	DreamBig	9/4/17	8/31/19
Los Angeles CSC	MOE	3/24/18	1/6/19
Louisville KSC	BackWild	3/23/18	3/22/19
	FON	6/18/15	7/2/20
	FOTB	9/30/12	6/30/19
	LastReef	2/8/14	6/30/19
	OOBP	8/15/18	6/15/19
	PTJH	7/4/14	7/20/20
	TA	2/1/16	7/31/19
	TinyGian	9/21/17	9/30/19
	TOTIA	6/30/18	7/31/19

Theater	Film	Open	Close
Lubbock SS	AMJ	7/6/18	7/6/19
	BackWild	**11/9/18**	**5/30/19**
	DreamBig	2/2/18	2/1/19
	OOBP	5/1/18	5/31/19
Lucerne	AMJ	9/1/18	9/1/19
	NPA	3/17/16	11/30/18
	OOBP	6/1/18	6/30/19
	WildAfri	9/21/17	9/30/19
Lucknow	Greece	12/1/17	11/30/18
McMinnville	DSC	6/16/16	
	FightPil	3/23/12	
	LITAOA	4/10/15	5/30/19
	LOF	3/23/12	
	Rescue	6/1/12	
	RobotsNG	11/6/15	5/30/19
Melbourne MV	AmazAdve	9/15/17	9/13/19
	AMJ	**8/23/18**	
	AMMM	7/11/16	
	FON	9/1/15	12/31/18
	MA	1/30/17	1/28/19
	Mummies	9/22/17	9/30/19
	OOBP	3/21/18	3/31/19
	TinyGian	9/22/17	9/30/19
	TOTIA	9/22/17	9/30/19
	WildAfri	1/4/18	1/31/19
	WWDPP3D	9/22/17	9/30/19
Memphis Pink	AMJ	8/11/18	8/10/19
	DreamBig	2/10/18	3/2/19
	ExtrWeat	3/24/17	8/31/19
	JTTSP	5/26/18	5/25/19
	TinyGian	11/17/18	5/22/20
Mexicali	AMJ	9/22/18	3/21/19
	NPA	**4/22/18**	**4/23/19**
Mexico City Pap	AmazAdve	11/17/17	11/16/18
	AMJ	3/15/18	3/14/19
	DreamBig	3/15/17	12/31/18
Mexico City PAP	HumpbWha	11/16/16	11/30/18
Milwaukee	HumpbWha	2/1/18	1/30/19
	MounQues	10/1/18	9/30/19
	OOBP	6/14/18	6/30/19
	Penguins	10/23/17	6/20/19
	TOTIA	6/14/18	6/30/19
Mobile	NPA	5/26/18	5/25/19
Monterrey Pap	DreamBig	2/2/18	2/1/19
	JTTSP	6/10/16	12/31/18
Montreal SC	AMJ	5/18/18	5/17/19
	OOBP	6/1/18	6/30/19
Moscow Kin	AMJ	4/15/18	4/14/19
	DreamBig	**9/10/17**	**6/1/19**
	FlyMons	10/1/16	12/31/18
	NPA	**9/17/16**	**12/1/19**
	TTA	**11/1/16**	**12/1/19**
Mount Pleasant Cel	**DreamBig**	**7/15/17**	**7/31/19**
Mumbai Ino	MOTUW	1/1/18	12/31/19
	RobotsNG	1/1/18	1/1/19
Muskegon Cel	**DreamBig**	**7/15/17**	**7/31/19**
Nanchang JTSC	CRA		12/30/18
New Delhi ICC	ND		
New Orleans	HOTB	9/15/15	12/31/18
	OOBP	3/30/18	3/31/19
	TOTIA	7/1/17	6/30/19
	Wild Ocean	7/1/17	6/30/19
	WildAfri	9/21/18	12/20/18
	WildOcea	7/1/17	6/30/19
	WWDPP3D	6/22/18	12/31/18
New York AMNH	BackWild	9/14/18	3/13/19
Niagara Can DCI	Niagara	7/1/86	
Niagara NY DCI	Niagara	5/1/07	
Norwalk MA	OOBP	10/5/18	10/31/19
Nuremberg	HumpbWha		12/31/18
	NPA	3/10/16	12/31/18
Omaha Zoo	**BackWild**	**11/1/18**	**4/30/19**
	OOBP	3/30/18	3/31/19
Orlando SC	AmazAdve	2/24/18	2/23/19
	BackWild	**11/1/18**	**10/31/19**
	EarthFli	4/1/18	4/30/19
	G3DNW	7/5/14	1/4/19
	NPA	2/12/16	11/17/18
	OOBP	4/16/18	4/30/19
Paris Geo	AMJ	3/7/18	3/6/19
	OOBP	6/20/18	12/31/18
	SFLIS	1/30/18	1/29/19
Parker	HidUniv	7/29/18	7/21/19
Pensacola NAM	ACGOTS	5/26/17	6/30/19
	D-Day	7/1/18	12/31/18
	MOF	11/8/96	
Peoria RM	AmazAdve	6/20/18	1/19/19
	AMJ	2/16/18	2/15/19
	FOTB	4/1/16	6/30/19
	Mummies	10/16/18	10/31/20
	OOBP	9/28/18	9/30/19
	TinyGian	6/30/18	6/30/20
	WWDPP3D	6/30/18	6/30/19
Philadelphia FI	DreamBig	3/1/18	2/28/19
	ExtrWeat	2/11/17	2/11/19
	G3DNW	9/6/16	12/31/18
	OOBP	5/1/18	5/1/19
	Vikings	10/13/18	10/1/19
Phoenix ASC	AmazAdve	8/16/18	2/15/19
	AOTE	12/26/17	12/31/18
	IncrPred	10/19/18	10/31/19
	OOBP	5/4/18	5/31/19
	TOTIA	**12/1/18**	**12/31/19**
	WildAfri	3/2/18	3/31/19
Pittsburgh CSC	AmazAdve	11/17/17	6/30/19
	BackWild	8/31/18	6/30/19
	DreamBig	**11/17/17**	**12/31/19**
	HumpbWha	6/17/16	12/31/18
	NPA	**2/12/16**	**12/31/19**
	TinyGian	**11/15/17**	**11/30/19**
Poitiers Imax	TinyGian	4/1/16	4/30/19
Poitiers Imax 3D	MOTUW	2/1/16	1/31/19
Port of Spain	Hurrican	4/26/18	4/25/19
	JMCSO	2/7/17	2/28/19
	TurtOdys	9/27/18	9/26/19
Portage Cel	**DreamBig**	**6/30/17**	**7/31/19**
	GCA	9/1/18	7/31/19
	HumpbWha	9/1/18	7/31/19
	NPA	10/1/18	7/31/19
	TTA	6/1/18	7/31/19
Portland OMSI ET	AmazAdve	2/16/18	2/15/19
	AOTE	1/26/18	1/31/19
	BackWild	9/7/18	9/6/19
	DinoAliv	1/26/18	1/31/19
	DreamBig	2/17/17	3/1/19
	DSC	**1/16/15**	**4/28/19**
	FlyMons	5/22/14	4/9/19
	FOTB	1/7/14	6/30/19
	GWS	1/26/18	1/31/19
	JMCSO	3/1/17	2/28/19
	JTS	3/20/15	3/21/19
	MOE	10/6/18	1/27/19
	Mummies	1/26/18	3/31/19
	NPA	2/12/16	3/1/19
	OOBP	4/20/18	4/30/19
	RobotsNG	3/15/18	3/17/19
	SeaMonst	**1/15/14**	**4/28/19**
	TA	1/26/18	1/31/19
	Volcanoes	10/13/18	10/12/19
	WildAfri	1/26/18	1/31/19
	WWDPP3D	1/26/18	1/31/19
Poznan CC	AfricAdv		9/30/19
	TurtTale		9/30/19
Prague CC	G3DNW	5/22/14	5/21/19
	TTA	12/8/17	12/1/18
Raleigh	AMJ	9/1/18	8/31/19
	BackWild	6/4/18	6/3/19
	D-Day	5/23/14	2/1/19
	DreamBig	2/17/17	12/31/18
	FOTB	10/19/17	6/30/19
Regina	AmazAdve	2/16/18	2/15/19
	AMJ	5/11/18	5/12/19
	DreamBig	**2/17/17**	**12/31/19**
	RobotsNG	9/1/18	9/1/19
Richmond SMV	AmazAdve	5/1/18	4/30/19
	DreamBig	2/18/17	12/31/18
	FOTB	5/1/13	6/30/19
	GCA	6/1/16	7/31/19
	HumpbWha	3/14/15	7/31/19
	NPA	4/10/16	4/30/19
	OOBP	6/1/18	6/30/19
	WildAfri	2/1/17	
Rishon YP	Jerusale	12/7/17	12/6/18
Rochester MSC	Dolphins	12/1/17	12/31/18
Sacramento Imx	AmazAdve	9/8/17	6/30/19
	ExtrWeat	2/24/17	
	FOTB	8/13/13	5/31/19
	GWS	2/20/15	6/30/19
	HumpbWha	8/19/16	10/24/19
	Jerusale	9/15/14	10/31/19
	LastReef	5/20/16	6/30/19
	Mummies	1/1/17	6/30/19
	TLR	5/20/16	6/30/19
	TurtOdys	9/21/18	3/20/19
Saint Augustine	AMJ	6/1/18	5/30/19
	ExtrWeat	10/15/16	10/14/19
	FOTB	1/18/13	6/30/19
	GBR3D	8/20/18	8/19/20
	Gruffalo	1/1/15	12/31/18
	GruffChi	2/1/15	12/31/18
	L&C		6/14/19
	ROTB	10/3/15	12/31/18
Saint Félicien	AOTE	4/1/18	11/30/19
	WOTA	4/1/18	11/30/19
Saint Louis SC	ExtrWeat	1/13/17	12/12/18
	NPA	2/12/16	3/31/19
Saint Paul SMM	DreamBig	3/2/18	12/31/18
	LITAOA	10/12/18	3/10/19
Salt Lake City Clark	ConqOTS	4/7/18	11/9/18
	G3DNW	**11/1/18**	**10/31/19**
	GBR3D	7/21/18	3/29/19
	Jerusale	12/21/18	12/31/18
	LBC	12/21/18	12/31/18
	Pandas	5/19/18	3/29/19
	SFLIS	**2/16/18**	**2/15/19**
	SOE	11/10/18	11/9/19
San Diego MV AMC	ACGOTS	11/10/17	11/9/18
San Diego NHM	BackWild	8/1/18	2/28/19
	NPA	**12/1/18**	**8/31/19**
	TOTIA	1/3/18	3/31/19
San Diego RHF	Bugs	7/1/14	6/30/19
	DreamBig	3/10/17	4/1/19
	FOTB	10/12/12	6/30/19
	GBR3D	7/5/18	7/5/19
	OOBP	3/1/18	3/31/19
	WOTA	**12/7/18**	**12/31/19**
San Jose Tech	AMJ	2/17/18	2/16/19
	DreamBig	**2/17/17**	**11/1/19**
	GWS	10/31/18	1/31/20
	Jerusale	3/15/15	6/20/19
	L&C	6/8/16	6/20/19
	NPA	**2/12/16**	**11/1/19**
San Simeon DCI	HCBTD	8/17/96	
Seattle PSC 2	AmazAdve	11/10/17	
	AMJ	9/7/18	9/6/19
	D-Day	3/29/14	6/30/19
	DreamBig	**2/17/17**	**6/30/19**
	OOBP	4/20/11	4/30/19
	TurtOdys	**12/7/18**	**5/31/19**
Shanghai 3D STM	AmazAdve	8/1/18	8/1/19
	DreamBig	**9/19/17**	**12/30/18**
	MA	12/1/17	11/30/18
Shijiazhuang HST	Alaska	1/1/17	1/1/19
Singapore DC	DreamBig	10/1/18	4/1/19
Singapore SC	SpaceNex	6/1/18	6/1/19
Sinsheim	**NPA**	**3/4/16**	**12/30/18**
Sioux Falls	AmazAdve	12/2/17	6/30/19
	DreamBig	6/2/17	6/30/19
	ISR	5/4/18	4/30/19
	LastReef	1/30/15	6/30/19
	Meerkats	**6/1/18**	**12/31/18**
	MOC	1/25/18	1/31/19
	TinyGian	7/1/17	6/30/19
	TLR	7/1/17	6/30/19
	TurtOdys	9/1/18	1/31/19
Speyer Dome	Dolphins		12/30/18
	Jerusale	12/12/13	12/11/19
	JTTSP	5/25/17	12/31/18
	MOF	12/1/97	12/31/18
Stockholm	Animalop	10/1/17	10/1/19
	DreamBig	3/15/18	3/15/19
	JTTSP		12/31/18
	TOTIA		12/31/18
Sudbury	BackWild	9/4/18	6/30/19
	DreamBig	2/17/17	6/30/19
	HumpbWha	9/24/15	
	MOC	9/7/17	10/31/19
	NPA	**2/12/16**	**6/30/19**
	TinyGian	6/24/16	5/31/19
	TurtOdys	**12/7/18**	**12/6/19**
Syracuse MOST	DinoAliv	10/5/18	1/31/19
Taichung NMNS	SFLIS	7/1/17	12/30/18
Tallahassee CLC	AmazAdve	4/28/17	6/30/19
	AMJ	2/16/18	2/15/19
	BackWild	**10/18/18**	**10/18/19**
	ExtrWeat	5/19/17	5/1/20
	FOTB	1/18/13	6/30/19
	MOTUW	3/17	3/20
	RobotsNG	10/16/15	11/8/18
	TinyGian	1/6/16	7/31/19
	WildAfri	5/15/16	6/30/19
	WWDPP3D	4/19/16	7/31/19
Thessaloniki	**DreamBig**	**10/28/17**	**10/2/19**
Tijuana	AMJ	3/1/18	2/28/19

Theater	Film	Open	Close
	ExtrWeat	7/28/17	6/1/19
	Jerusale	4/1/15	3/14/19
	OOBP	4/1/18	4/30/19
Toronto OP	ACGOTS	6/1/18	6/1/19
Toronto OSC	CRA	2/24/18	2/23/19
	JTS	10/15/18	10/15/19
	OOBP	6/15/18	6/30/19
Valencia Spn	AMJ	7/1/18	6/3/19
	DreamBig	4/1/18	6/30/19
	NPA	**10/7/16**	**6/30/19**
	WWDPP3D	7/1/16	3/31/19
Vancouver TWS	**AmazAdve**	**12/22/17**	**6/30/19**
	AMJ	3/17/18	3/16/19
	HumpbWha	10/9/15	6/30/19
	Mummies	7/1/17	6/30/19
	NPA	2/12/16	6/30/19
	Pulse	7/1/17	6/30/19

Theater	Film	Open	Close
	TOTIA	7/1/17	12/31/18
	Volcanoes	11/17/18	9/30/19
	WOTA	7/1/17	6/30/19
Victoria DCI	AmazAdve	4/14/17	6/30/19
	AMJ	3/9/18	3/8/19
	DreamBig	**3/17/17**	**12/31/19**
	FOTB	4/5/13	6/30/19
	Hurrican	2/1/18	1/31/19
	IncrPred	11/16/18	11/30/19
	MOE	5/18/18	12/31/18
	MOTUW	10/9/15	11/8/18
	OOBP	7/1/18	7/31/19
	SFLIS	**9/22/17**	**12/31/19**
	SOE	9/11/18	
Virginia Beach AMSC	**BackWild**	**6/30/18**	**12/31/19**
	G3DNW	5/28/16	12/31/18
	ROTB	10/26/18	10/28/19

Theater	Film	Open	Close
	TurtOdys	**6/30/18**	**12/31/19**
Warsaw CC	AfricAdv		9/30/19
	TurtTale		9/30/19
Washington NASM	ACGOTS	5/26/17	5/25/19
	AmazAdve	4/21/18	12/31/18
	D-Day	5/23/17	5/22/19
	DreamBig	2/17/17	2/16/20
	Jerusale	10/23/17	12/31/18
	JTS	3/6/15	
	LITAOA	4/10/15	
	TO FLY	7/1/76	12/31/18
	ToFly	3/7/16	12/31/18
Wroclaw CC	AfricAdv		9/30/19
	TurtTale		9/30/19
Yellowstone	NPA	5/1/16	2/11/19

Key to Film Abbreviations

Film	Title	Year	Dist	
ACGOTS	Aircraft Carrier: Guardian of the Seas	2016	3D	K2
AfricAdv	African Adventure 3D	2007	3D	nWP
AirRacer	Air Racers 3D: Forces of Flight	2012	3D	K2
Alaska	Alaska: Spirit of the Wild	1997		K2
AmazAdve	Amazon Adventure	2017	3D	SKF
Amazon	Amazon	1997		MFF
AMJ	America's Musical Journey	2018	3D	MFF
AMMM	Amazing Mighty Micro Monsters 3D	2016	3D	nWP
Animalop	Animalopolis	2008	3D	K2
AOTE	Antarctica 3D: On the Edge	2014	3D	GSF
Arabia	Arabia	2010	3D	MFF
AsterME	Asteroid: Mission Extreme	2016	3D	CPD
BackWild	Backyard Wilderness	2018	3D	SKF
Bugs	Bugs!	2003	3D	SKF
ConqOTS	Conquest of the Skies	2017	3D	nWP
CRA	Coral Reef Adventure	2003		MFF
D-Day	D-Day: Normandy 1944	2014	3D	K2
DIA	Dream is Alive, The	1985		IMAX
DinoAliv	Dinosaurs Alive	2007	3D	GSF
Dolphins	Dolphins	2000		MFF
DreamBig	Dream Big: Engineering Our World	2017	3D	MFF
DSC	Deepsea Challenge 3D	2015	3D	CPD
EarthFli	Earthflight	2017	3D	GSF
Electrop	Electropolis	2014	3D	CPD
Everest	Everest	1998		MFF
ExtrWeat	Extreme Weather	2016	3D	CPD
FightPil	Fighter Pilot: Operation Red Flag	2004	3D	K2
FlyMons	Flying Monsters 3D	2011	3D	CPD
FON	Forces of Nature	2004		CPD
FOTB	Flight of the Butterflies	2012	3D	SKF
G3DNW	Galapagos 3D: Nature's Wonderland	2014	3D	nWP
GBR3D	Great Barrier Reef	2018	3D	MFF
GC	Grand Canyon: The Hidden Secrets	1985		DCI
GCA	Grand Canyon Adventure: River at Risk	2008	3D	MFF
GlobSoun	Global Soundscapes: Mission to Record the Earth	2016	3D	FIC
Greece	Greece: Secrets of the Past	2006		MFF
Gruffalo	Gruffalo, The	2014	3D	B&D
GruffChi	Gruffalo's Child	2015	3D	B&D
GWS	Great White Shark	2013	3D	GSF
HCBTD	Hearst Castle: Building the Dream	1996		DCI
HidUniv	Hidden Universe	2013	3D	MFF
HOTB	Hurricane on the Bayou	2006		MFF
HumpbWha	Humpback Whales	2015	3D	MFF
Hurrican	Hurricane	2017	3D	nWP
IncrPred	Incredible Predators	2016	3D	GSF
ISR	In Saturn's Rings	2018		B&D
Jerusale	Jerusalem	2013	3D	CPD
JMCSO	Jean-Michel Cousteau's Secret Ocean	2015	3D	K2
JTM	Journey to Mecca	2009		CPD
JTS	Journey to Space	2015	3D	K2
JTTSP	Journey to the South Pacific	2013	3D	MFF
Kenya	Kenya 3D: Animal Kingdom	2013	3D	K2
L&C	Lewis & Clark: Great Journey West	2002		CPD
LastReef	Last Reef, The	2012	3D	GSF
LBC	Light Before Christmas, The	2008		K2
LITAOA	Living in the Age of Airplanes	2015		CPD
LivingSe	Living Sea, The	1995		MFF
LOF	Legends of Flight	2010	3D	K2
MA	Museum Alive 3D	2016	3D	nWP
Meerkats	Meerkats 3D	2012	3D	CPD
MOC	Mysteries of China	2016	3D	GSF
MOE	Mysteries of Egypt	1998		DIC
MOF	Magic of Flight, The	1997		MFF
MOTUW	Mysteries of the Unseen World	2013	3D	CPD
MounQues	Mountain Quest	2018		K2
Mummies	Mummies: Secrets of the Pharaohs	2007		GSF

Film	Title	Year	Dist	
ND	Neelkanth Darshan	2005		unk
Niagara	Niagara: Miracles, Myths, and Magic	1987		DCI
NPA	National Parks Adventure	2016	3D	MFF
OOBP	Oceans: Our Blue Planet	2018	3D	GSF
Ozarks	Ozarks: Legacy and Legend	1993		IMAX
Pandas	Pandas	2018	3D	IMAX
Penguins	Penguins 3D	2013	3D	nWP
PlanPowe	Planet Power	2018	3D	nWP
PTJH	Pandas: The Journey Home	2014	3D	CPD
Pulse	Pulse: A Stomp Odyssey	2002		GSF
Rescue	Rescue 3D	2011	3D	K2
RobotsNG	Robots	2015	3D	CPD
ROTB	Room on the Broom	2015	3D	B&D
SeaMonst	Sea Monsters: A Prehistoric Adventure	2007		CPD
SFLIS	Search for Life In Space, The	2016	3D	MFF
SOE	Story of Earth, The	2018	3D	DMD
SOG	Secrets of Gravity, The	2017	3D	B&D
SpaceNex	Space Next 3D	2015	3D	B&D
TA	Tornado Alley	2011	3D	GSF
TinyGian	Tiny Giants 3D	2014	3D	GSF
ToFly	To Fly!	1976		MFF
TOTIA	Titans of the Ice Age	2013	3D	GSF
TTA	To the Arctic	2012	3D	MFF
TurtOdys	Turtle Odyssey	2018	3D	SKF
TurtTale	Turtle's Tale: Escape from Paradise, A	2013	3D	nWP
VanGogh	Van Gogh: Brush with Genius	2009		MFF
Vikings	Vikings	2004		GSF
Volcanoes	Volcanoes	2018	3D	SKF
WATE	Wild Australia: The Edge	1997		MSI
WildAfri	Wild Africa 3D	2015	3D	GSF
WildOcea	Wild Ocean	2008	3D	GSF
WM	Watermelon Magic	2013	3D	B&D
WOTA	Wonders of the Arctic	2014	3D	GSF
WTTR3D	Waking the T-Rex: The Story of Sue 3D	2010	3D	GSF
WWDPP3D	Walking With Dinosaurs: Prehistoric Planet 3D	2014	3D	GSF

Nov.-Dec. 2018 Bookings Count

#	Film	#	Film	#	Film	#	Film
51	DreamBig	7	MOC	3	FON	1	Kenya
39	NPA	7	TurtTale	3	MOE	1	LBC
38	OOBP	6	AfricAdv	2	AsterME	1	LivingSe
34	AmazAdve	6	Mummies	2	ConqOTS	1	LOF
34	AMJ	6	SFLIS	2	Greece	1	Meerkats
24	BackWild	6	WOTA	2	ISR	1	MounQues
19	FOTB	5	Bugs	2	JTM	1	ND
17	HumpbWha	5	CRA	2	MOF	1	Ozarks
16	ExtrWeat	5	DinoAliv	2	Niagara	1	Pandas
13	D-Day	5	DSC	2	PTJH	1	Penguins
12	TinyGian	5	FightPil	2	ROTB	1	PlanPowe
12	WildAfri	5	IncrPred	2	SeaMonst	1	Pulse
11	GBR3D	5	MA	2	TLR	1	Rescue
11	Jerusale	5	TA	1	AirRacer	1	SOG
11	TOTIA	5	TTA	1	Alaska	1	TO FLY
10	RobotsNG	4	AOTE	1	Amazon	1	ToFly
10	Volcanoes	4	Dolphins	1	AMMM	1	VanGogh
9	JTS	4	Everest	1	Animalop	1	Vikings
9	TurtOdys	4	GCA	1	Arabia	1	WATE
9	WWDPP3D	4	HidUniv	1	DIA	1	Wild Ocean
8	ACGOTS	4	Hurrican	1	Electrop	1	WildOcea
8	FlyMons	4	JMCSO	1	GC	1	WM
8	JTTSP	4	L&C	1	GlobSoun	1	WTTR3D
8	MOTUW	4	LastReef	1	Gruffalo		
7	G3DNW	4	SOE	1	GruffChi		
7	GWS	4	SpaceNex	1	HCBTD		
7	LITAOA	3	EarthFli	1	HOTB		

Directory of Organizations Mentioned in this Issue of LF Examiner

Distributors' abbreviations are listed in **bold.**

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www.cameralucida.fr/

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10550 Camden Drive
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Fax: 714-229-7128
www.christiedigital.com

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Sydney, NSW 2021 AUSTRALIA
www.definitionfilms.com.au/

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Fax: 801-392-6703
www.destinationcinema.com

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14 Jerome Street
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http://digitalcrossing.ca/

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www.dreamworld.com.au

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www.kodak.com

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www.flyovercanada.com

Foxfire Interactive Corporation **FIC**
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North Attleboro, MA 02760 USA
Tel: 508-699-6650
Fax: 508-699-6651
www.foxfireinteractive.com

Giant Screen Cinema Association
624 Holly Springs Road
Suite 243
Holly Springs, NC 27540 USA
Tel: 919-346-1123
www.giantscreencinema.com

Giant Screen Films **GSF**
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Evanston, IL 60201 USA
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Fax: 847-475-9145
www.gsfilms.com

Golden Gate 3D
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San Francisco, CA 94130 USA
Tel: 415-779-4433
http://gg3d.com/

Grand Schema
New York, NY USA

Gulf Coast Exploreum Science Center
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PO Box 1968
Mobile, AL 36602 USA
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Fax: 251-208-6889
www.exploreum.com/

Imax Corporation **IMAX**
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Fax: 905-403-6450
www.imax.com

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www.k2communications.com/

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www.lageode.fr

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Fax: 949-494-2079
www.macfreefilms.com

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Auckland, 1011 NEW ZEALAND
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Milbrand Cinema
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Los Gatos, CA 92033 USA
www.milbrandcinema.com

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Oceanic Research Group
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North Reading, MA 01864 USA
Tel: 978-664-9091
www.oceanicresearch.org

Ouragan Films
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Pelissanne, 13330 FRANCE
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www.ouragan-lefilm.com

Saint Thomas Productions
Village d'Entreprises Saint Henri
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Marseille, 13016 FRANCE
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www.saint-thomas.net/

Science Center of Iowa
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Fax: 515-274-3404
www.sciowa.org

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http://serengetientertainment.com

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Fax: 416-597-0352
www.simex-iwerks.com

SK Films, Inc. **SKF**
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Tel: 416-367-0440
Fax: 647-837-3350
www.skfilms.ca

Spirit Bear Entertainment
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http://bcspiritbear.com/

Starbreeze Studios
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www.starbreeze.com

Statement Pictures, LLC
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Brooklyn, NY 11215 USA
www.statementpictures.com

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Fax: 514-633-6035
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Tandem Stills + Motion
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Tech Museum of Innovation
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Texas Instruments
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Plano, TX 75086 USA
Tel: 972-575-2000
www.ti.com

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Hong Kong, CHINA
Tel: +351 919 593 245
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www.viastudiosglobal.com/

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Fax: 717-221-8208
www.whitakercenter.org

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SHORTS

GSCA announces new board

The **Giant Screen Cinema Association** has announced the composition of its 2019 board of directors and officers. Names in italics were elected this fall and will serve for two years, starting Jan. 1.

Representing commercial theaters:

Paul Wild, IMAX Victoria, Royal BC Museum

Representing institutional theaters:

Caroline Borgudd, Cosmonova, Swedish Museum of Natural History

Phillip Crabtree, National Naval Aviation Museum

Michelle Duncan, Tech Museum of Innovation

Marlene Janetos, Museum of Discovery and Science

Julie LaRoche, Montreal Science Centre

Alan Nursall, TELUS World of Science, Edmonton

Joanie Philipp, Discovery Place

Andy Zakrajsek, COSI

Representing distributors:

Mary Jane Dodge, MacGillivray Freeman Films

Mark Katz, Giant Screen Films/D3D Cinema

Tina Ratterman, BIG & Digital

Representing production:

Taran Davies, Cosmic Picture

Christian Fry, CVF Productions

Meghan MacGillivray, MacGillivray Freeman Films

Phil Streather, Principal Large Format

Representing manufacturers, suppliers, and other related businesses:

Diane Carlson, Giant Screen Cinema Consulting

Michael Daut, Mousetrappe

Rick Gordon, RPG Productions

Patricia Keighley, Imax Corporation

Derek Threinen, Giant Screen Films/D3D Cinema

The following directors were elected as officers: Alan Nursall, chair; Paul Wild, vice chair; Christian Fry, secretary; Andy Zakrajsek, treasurer.

In addition to the officers above, the Taran Davies and Patricia Keighley were elected to the Executive Committee to "ensure it more accurately represents the GSCA membership categories," according to a press release. An additional ex officio director will be designated by Euromax.

GSCA extends its sincere appreciation to the following board members, who complete their terms in 2018: Kim Cavendish, Museum of Discovery and Science (retired); Mike Lutz, Evans and Sutherland; Gordon Stalans, Tennessee Aquarium.

Ryan Reynolds narrates *Great Bear*

Actor **Ryan Reynolds** will narrate ***Great Bear Rainforest***, produced by **Spirit Beard Entertainment** and distributed by **MacGillivray Freeman Films**. The Canadian actor is the star and producer of the *Deadpool* franchise and has more than 50 feature film acting credits.

The film's main title theme will be written by Oscar-winning composer **Hans Zimmer**, whose other credits include ***Interstellar*** and ***The Dark Knight Rises***. **Anze Rozman** will compose the score.

Great Bear Rainforest focuses on the region of the same name in British Columbia, Canada, "home to an immense array of wildlife, including the fabled all-white spirit bear — the rarest bear on earth — and the indigenous First Nations, who have provided stewardship of the forest for millennia," according to a press release. The film will be released on Feb. 15, 2019.

Imax closing VR centers

Imax Corporation has closed four of its seven pilot Virtual Reality centers and is winding down its three-year experiment in VR. It closed one of two locations in New York City in June and the other in October; in July the Shanghai site was shuttered, and in November the only European center, in Manchester, UK, was closed.

As this issue went to press in mid-December, Imax submitted a filing with the U.S. Securities and Exchange Commission stating that it has decided to close the remaining VR centers in Toronto, Bangkok, and Los Angeles, and take a one-time charge of $6.9 million in the fourth quarter of 2018. That charge includes other unspecified cuts in "certain areas" intended to "decrease costs and increase operating leverage."

No dates were given for the closing of the last three centers, but at this writing none of the three was selling tickets beyond Dec. 23.

(The SEC filing also said that the company would take a one-time charge of $3.3 million "associated with the transition" of **Greg Foster**, CEO of Imax Entertainment, who recently announced he would leave the company [*see The Biz, Sept-Oct 2018*].)

Imax began its foray into VR in May 2016 with announcements that it was developing a high-end, 360-degree, 3D VR camera system with **Google** and a VR headset system with **Starbreeze AB**, a Swedish developer of VR content and hardware. In late 2016 Imax said it was raising $50 million to create VR content. The first VR center, in Los Angeles, opened in January 2017, and although a dozen were reportedly planned, only seven actually opened. The camera development project with Google ended in August 2018.

At every step of the way, CEO **Richard Gelfond** insisted that the venture was an experiment and that the centers were pilots to determine what worked and what didn't, in terms of hardware, programming, and business models. Apparently, no combination of the three turned out to be economically viable. Foreshadowing the latest decision, CFO **Patrick McClymont** said in the Q3 conference call that the company would not be spending anything on VR in 2019.

Iowa IMAX remains closed

The Blank IMAX Dome Theater at the **Science Center of Iowa** in Des Moines remains closed after suffering water damage from two major storms in June (*see Shorts, Summer 2018*). The theater's 13-year-old 15/70 projector, the 66-foot (30-meter) dome screen, the sound system, seats, carpeting, and a number of film prints were damaged.

According to a local press report, **Imax Corporation** is working with the center to determine its options, which presumably include the new IMAX laser dome system. Once a plan for replacing or repairing the projector is established, the insurance company will decide how much of the cost it will cover, and the work can start.